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An Assessment of Schools' Wellness Policies and Teachers' Perspectives and Confidence in Teaching Nutrition in Elementary Schools in Jeddah, Saudi Arabia

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By

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Abstract

Nutrition education in school can provide students with the knowledge and skills to improve their eating behavior and overall health. This study aimed to evaluate the content of school wellness policies and understand teacher perspectives about teaching nutrition education at their schools in Jeddah, Saudi Arabia. In 2020, electronic surveys were used to evaluate the wellness policies in 11 elementary all-female government schools and teachers' perspectives about the nutrition education offered in three elementary all-female government schools. Sixty-one teachers and eleven principals participated in this study. Fisher's exact tests were used to test the differences between teachers' perspectives and their confidence level and characteristics. A p-value of less than 0.05 was considered statistically significant. Results showed that most schools (N=10) have a formal school wellness policy that provides a healthy environment for students and ensures facilitate their access to healthy eating and exercise. Many teachers (55.2%) agreed that there are adequate resources are available to them to teach nutrition in the schools, and (58.6%) of them agreed that they have had adequate training from qualified people on nutrition education. Most teachers (94.7%) were confident in teaching nutrition and physical activity to their students. Teachers between 30-50 years of age were more interested in teaching nutrition than teachers whose age is more than 50 years old ($P < 0.05$). In summary, schools operated very efficiently to offer nutritional education for students, and most teachers are confident and interested in teaching nutrition. There is a need for further studies investigating nutrition education in schools in Saudi Arabia.

Keywords: Nutrition education, wellness policies, elementary schools, teachers, Saudi Arabia.

Dedication

To my all esteemed and dear family members, to my esteemed parents, may God preserve their life and health, to my husband, who helped me a lot in my life, to my adorable kids, and to all researchers and students, I dedicate you this scientific thesis in "An assessment of schools' wellness policies and teachers' perspectives and confidence in teaching nutrition in elementary schools in Jeddah, Saudi Arabia".

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Chapter 1: Introduction

Good nutrition and physical activity are essential for children to help them grow, develop properly, and protect them from health conditions such as obesity that could impact their quality of life. Globally, overweight and obesity rates increased in 2013 compared to 1980 among children and adolescents aged 2-19 years, where the prevalence of overweight and obesity in developed countries had risen from 16.9% to 23.8% among boys and from 16.2% to 22.6% among girls, and in developing countries, it had risen from 8.1% to 12.9% in boys and from 8.4% to 13.4% in girls (Ng et al., 2014). Likewise, since 1988-1994, childhood obesity has become a serious issue in the U.S., where its prevalence among children (ages 2-19 years) increased from 10% to 18.5% in 2015-2016 (Cha, 2018). According to UNICEF (2019), cities of the Middle East and North Africa were ranked second in the world with regard to the prevalence of obesity among children, where 5.4 million children were overweight in 2019 in comparison to 3.4 million children in 2000.

Saudi Arabia is one of many countries facing the problem of obesity among its people. It witnessed development and prosperity in the economy and lifestyle changes over the past 30 years, and the Saudis rely more on cars for transportation instead of walking or biking than ever. Use of electronic devices such as are increasingly common among children instead of playing outside and running (The Ministry of Health, 2012). All these reasons made the lives of the Saudis inclined to be sedentary and this contributed to increasing rates of obesity among children and adults (The Ministry of Health, 2012). According to the National Saudi Health Information Survey in 2013, the 23% of school-age children were overweight and 9.3% were obese (Al Shehri, 2013;

Ministry of Health, 2015). Children who are overweight are more likely to remain that way during adolescence and adulthood and at a higher risk of developing chronic diseases such as type 2 diabetes, high cholesterol, and heart disease (CDC, 2016). In addition, they are more likely to develop depression and lack of self-confidence (CDC, 2016).

Healthy eating, that is choosing food low in saturated fat, sugar, and salt, and physical activity contribute to maintaining weight and eliminating obesity in children (CDC, 2016). Unfortunately, most children and adolescents in the U.S. do not follow the 2015–2020 Dietary Guidelines for Americans' recommendations, which recommend consuming an eating pattern low in added sugars, saturated fats, and sodium and choosing a variety of nutrient-dense foods from each food group (protein, fruit, vegetables, grains, and milk). Children and adolescents in Saudi Arabia also do not follow the Saudi dietary recommendations, known as The Healthy Food Palm, where the recommendations suggest maintaining the intake of food in appropriate amounts from all major food groups (fruits, vegetables, dairy, grains, and protein) and avoiding food high in saturated fat, sugar, and salt (Ministry of Health, 2012). Previous studies conducted in different regions of Saudi Arabia that targeted children and adolescents aged 4 to 19 years old found that Saudi children and adolescent's consumption of fruits, vegetables, and milk is very low, and the consumption of fast foods, high-fat foods, sugary foods, and carbonated drinks is common (Collison et al., 2010; Al-Hazzaa et al., 2011). Among 107 female students aged 12-15 years in Riyadh, only 0.99% of them preferred eating fruits and vegetables in comparison to 36.63% preferred chocolate, and 39.6% preferred chips (Al Muammar and El Shafie, 2014). Also, 72.55% of 510 Saudi children aged 4–15

years had vitamin D deficiency, and 35.8% of 123 female children (age 6-12 years) had iron-deficiency anemia as a result of inadequate dietary intake (Mansour and Alhadidi, 2012; Gari, 2008). Moreover, in 2019, UNICEF indicated in its report about the state of nutrition in the Middle East and North Africa region that, "only 38% of children in the Middle East, where Saudi Arabia is located, and North Africa are fed a diverse diet (such as animal source foods, fruits, vegetables, beans, and dairy), and less than 1/4 meet the minimum acceptable diet for healthy growth and development" (UNICEF MENA, 2019).

In addition to the dietary recommendations, Saudi dietary guidelines recommend exercise for about 30 - 60 minutes daily (Ministry of Health, 2012). The results of a previous study conducted in 2009/2010 in three different regions in Saudi Arabia indicated that among 2866 people aged 15-19 years, only 31.5% of them met the recommended daily physical activity level where they exercise 60 minutes or more/day (Al-Hazzaa et al., 2014). Also, the WHO recommends that children should do some activities that strengthen muscles and bones, such as swimming and jogging, at least three times a week in order to improve their fitness and health. Based on estimates from the WHO in the early 2000s more than 55% of Saudi children and more than 70% of Saudi youths were physically inactive (Al-Hazzaa, 2004).

Research has shown that a reason for not following a healthy lifestyle might be the lack of nutritional education (Ying-Ying, et al., 2009). According to the CDC (2019), nutrition education significantly contributes to improving children's knowledge and skills to choose healthy food and beverage. Previous studies that assessed health literacy level, which is the level of the ability of individuals to obtain, process, and understand basic health information and services needed in ways which promote and maintain good health,

among the Saudi population, have shown that about 50% of Saudi population had inadequate health literacy that associated with poor knowledge of health information (Abdel-Latif, & Saad, 2019; Almubark et al., 2019). A national health survey issued in 2018 by the Saudi Food and Drug Authority, revealed that the level of nutritional knowledge of consumers in Saudi Arabia is low. Roughly 36% of the participant (N=12,675) knew the correct meaning of carbohydrates, 43.8% knew the correct meaning of protein, and only 39.7% defined the food portions and calories in a correctly (Saudi Food and Drug Authority, 2018). A study of 2571 Saudi people aged 15-18 years illustrated that most participants did not have adequate knowledge about energy-dense foods (such as foods high in saturated fat), and nutrient-dense foods (such as those rich in fiber) (Al-Almaie, 2005). The study also showed that most of these students get their nutritional information from social media and primary health care centers (Al-Almaie, 2005). These results indicate that there is a need to improve nutrition knowledge among people in Saudi Arabia. Previous studies indicate that the reason for the lack of nutritional knowledge among Saudi people is that there is a lack or nonexistence of school-based nutrition programs suggesting that teachers, parents, and children do not get nutrition education, training, and learning resources (Eid, 2018).

Schools play a fundamental role on children's health, as children spend more than 6 hours in school. Based on a cross-sectional study conducted among 2,314 children in grades one through 12 using 24-hour dietary recall data from the 2004-2005 third School Nutrition Dietary Assessment Study, about 35-47% of students' daily dietary intake is consumed at school (Briefel, Wilson, & Gleason, 2009). Taber and colleagues (2012) conducted a study among 6300 students in 40 states in fifth and eighth grade. The aim

was to determine whether state laws regarding competitive foods, which are foods and beverages sold outside of federal school meal programs such as chewing gum, carbonated soft drinks, and certain candies, are linked to weight gain in adolescents. In 2003 and 2006, states were classified based on the strength and comprehensiveness of the laws, where the laws included regulations of specific nutrients (Ex., fat content), specific beverage groups (Ex., sugar-sweetened beverages), and times of day when foods/beverages could be sold, to strong, weak, or no competitive food laws. The result found that students with stronger school nutrition policies, which their laws of regulating competitive food nutrition content were comprehensive and contain strong language, had fewer body mass index (BMI) units, and they were at lower risk to stay overweight/obese over time based on their BMI measurements. Also, teachers can contribute greatly to raising the level of knowledge and changing behavior among children because children are greatly affected by teachers as role models (Hall, 2015). A cluster-randomized, controlled trial study conducted by Donnelly and colleagues (2009) to evaluate Physical Activity Across the Curriculum (PAAC) in to promote physical activity and diminish increases in overweight/obesity among elementary school children have supported that the idea that the behavior of the teachers greatly affects students' behavior; where the results found that the chances for students to participate in physical activity programs will increase if teachers participate as well. Therefore, schools have a great opportunity to succeed in improving children's health by implementing educational programs and changing some food policies and activities provided in school.

Despite the primary role of schools in raising nutrition awareness among children, schools in Saudi Arabia lack of the nutrition education programs. The results of

a cross-sectional survey conducted in 2013 among 10 elementary schools that were randomly selected in Saudi Arabia to assess school-based nutrition programs in elementary schools found that all schools do not contain educational programs in the field of nutrition, and there was no nutrition coordinator (Alsubaie, 2017). Recently, the Ministry of Health, in cooperation with the Ministry of Education in Saudi Arabia, implemented an initiative to reduce obesity rates in schools by raising awareness, creating a database, providing a supportive environment, activating regulations and laws related to balanced food, physical activity, and fighting obesity at school age. The initiative started 2017 and still in progress, hoping to achieve its main goal which is the obesity rates among school-age children between the selected schools will be reduced by 5% by the end of the year 2020 (Ministry of Health, 2019).

This study investigated the need for nutrition education in elementary schools in Jeddah, Saudi Arabia. Elementary schools and its quality of their nutrition education program have been included in this study because the interest in nutrition education for children from an early age, starting from the basic stages in school helps build knowledge, skills, directions and positive health behaviors that help children to improve and enhance their health and avoid unhealthy habits and behaviors (Perera et al., 2015).

The purpose of this study is to evaluate the content of school wellness policies and understand teacher perspectives about teaching nutrition education at their schools in Jeddah, Saudi Arabia. Three questions directed this study:

1. What are the services provided in schools to facilitate a healthy lifestyle for students?
2. What is the relationship between teacher characteristics and confidence in teaching nutrition education?
3. What is the teacher's knowledge of the USDA Food Pyramid and Healthy Food Palm?

Chapter 2: Literature review

Childhood obesity

Globally, the prevalence of obesity among children and adolescents aged 5-19 years has a tenfold increase since 1975 from 11 million to 124 million in 2016 (WHO, 2017). Saudi Arabia is one of many countries facing the problem of obesity among children and adolescents between 5 and 19 years of age. In 2006, a cross-sectional study was conducted by Al-Dossary and colleagues in one of the cities of Saudi Arabia that targeted 7056 children aged 2–18 years to determine the prevalence of overweight and obesity in children. According to the body mass index of children, the study showed that 19.0% were overweight and 23.3% were obese (Al Dossary et al., 2010). A recent cross-sectional study using a multi-stage stratified sample of 915 elementary school children showed a high prevalence of obesity (36%) in elementary school children in Jeddah, Saudi Arabia (Farsi et al., 2016). Obesity and overweight among children and adolescents are evaluated using BMI-for-age growth charts that defined by the Centers for Disease Control and Prevention (CDC). The result is interpreted based on percentile range on the growth charts where if the result appears at or above 95th percentile is classified as obese; above 85th percentile and below 95th percentile is classified as overweight; 5th percentile to less than the 85th percentile is classified as normal; and below 5th percentile, classified as underweight (CDC, 2018).

World Health Organization (2013) stated that at least 2.8 million people die every year from obesity, and obesity is the fifth leading cause of death. Obesity is a health-threatening epidemic where it plays a key role in many diseases such as heart disease, diabetes, hypertension, and stroke (Nam, 2016). According to the Ministry of Health

(2012), in conjunction with the transformations that Saudi Arabia witnessed in the past decades that led to change dietary habits among Saudi people, diabetes mellitus emerged as a major public health problem. Obese children are at high risk of psychological and physical issues such as negative self-image, depression, hypertension, high cholesterol and diabetes (Daniels, et al., 2009). Obesity not only affects the individual, but its effect extends to the economy of the entire country where it costs about $147- $210 billion dollars per year (Levi et al., 2013). If obesity is not controlled from a young age, its effects may extend to the old age, so integrated programs should be developed to control obesity in children.

Dietary recommendations for youth

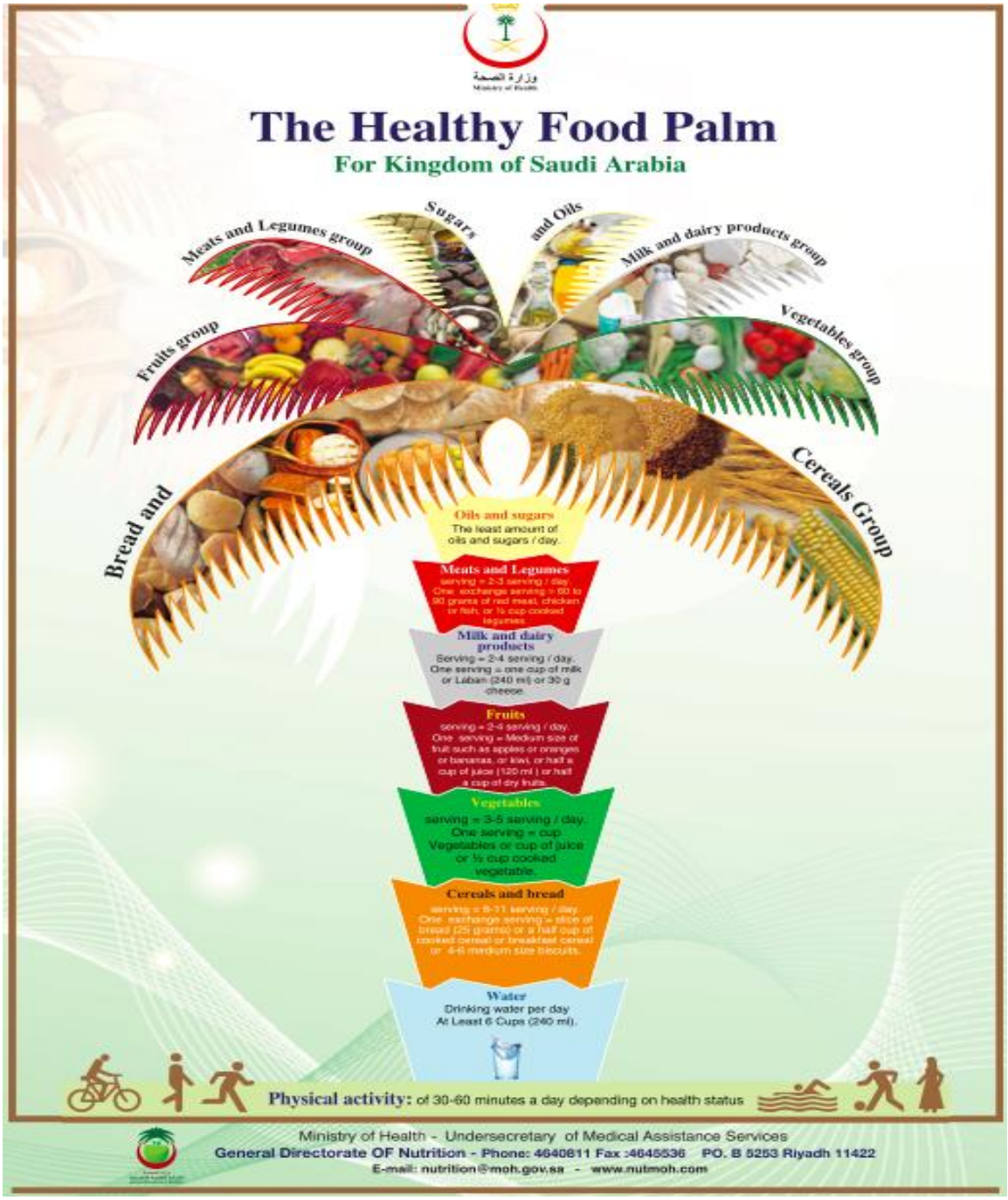
In 2012, the Ministry of Health in Saudi Arabia created easy and simplified food guidance graphics on its website, known as The Healthy Food Palm, to help people consume adequate amounts of all the essential nutrients the body needs for growth and to prevent chronic diseases such as obesity and diabetes and to support physical activity in the Saudi community (Ministry of Health, 2012). The form of the palm tree with the food groups distributed in the trunk and leaves of the palm was used to explain the recommendations of food groups and serving sizes (Figure 1). The Saudi dietary guidelines recommend people to eat 6-11 servings of bread and grains per day which is the largest portion, so they were placed at the bottom of the big palm leaf. As for vegetables and fruits, it recommends 3–5 servings/day and 2–4 servings/day, respectively. Also, it recommends eating 2-4 servings/day of milk and its products, and 2-3 servings/day of meat, and beans. Moreover, it recommends eating very little amounts of fat and sugar, so they were placed in the smallest upper leaves of the palm. Due to the hot

weather in Saudi Arabia, water was added to the palm tree, recommending at least 6 cups per day. As for physical activity, it recommends people to exercise for 30–60 min daily according to the person's health status (Figure 1) (Ministry of Health, 2012). Despite this, a cross-sectional study of 612 Saudi adults conducted in 2019 assessing the commitment of Saudis to the guidelines showed that Saudis do not adhere to these guidelines and there is a need for educational interventions to improve the quality of the diet between them (Halawani et al., 2019).

The Healthy Food Palm is the first Saudi dietary guidelines designed in 2012 by the Saudi Ministry of Health as a result of the high incidence of diet-related diseases in Saudi society, including obesity, diabetes mellitus, dyslipidemia and hypertension (Ministry of Health, 2012). It has been developed after reviewing the dietary habits of Saudis, the common diseases related to diet among Saudis, and the methods used to develop dietary guidelines based on scientific evidence such as the Dietary Guidelines for Americans, 2010, United Kingdom (UK) and Canada (Ministry of Health, 2012). Before 2012, the dietary guidelines used in Saudi Arabia were the Food Guide Pyramid that reported by The US Department of Agriculture because it is the oldest and most known dietary guidelines and graphic, and it is the most widely recognized complementary graphic to the dietary guidelines (Ministry of Health, 2012). Therefore, to investigate the knowledge of the Saudi population of the dietary guidelines, the Food Guide Pyramid should be considered in addition to the Healthy Food Palm.

Figure 1

The Healthy Food Palm, Saudi Ministry of Health, 2012.



Note. Copyright© 2012. The figure is included courtesy of the General Administration of Nutrition in the Saudi Ministry of Health, (Appendix D).

The 2015–2020 Dietary Guidelines for Americans recommend children and adolescents to consume eating patterns low in added sugars, saturated fats, and sodium and choosing a variety of nutrient-dense foods from each food group (protein, fruit, vegetables, grains, and milk). Unfortunately, most children and adolescents did not meet the recommendations of the Dietary Guidelines for Americans and instead of consuming their needs of fruit, vegetables, whole grains, and dairy foods, they consume more than their needs of refined grains, solid fats, and added sugars (2015–2020 Dietary Guidelines for Americans, 2015).

Fruits and vegetable consumption reduce many health risks, including obesity and many other chronic diseases such as hypertension, coronary heart disease and stroke (Dietary Guideline Advisory Committee, 2010; Boeing et al., 2012). According to the National Health and Nutrition Examination Survey (NHANES, 2012), even though children who are 4 to 8 years old meet the recommended intake for fruit, children who are 9 years old and older do not meet the recommended intake (United States Department of Health and Human Services (USDHSS) & United States Department of Agriculture (USDA), 2015). Ramsay and colleagues showed in their study which targeted 821 children aged 2 to 5 years to study nutrient intake and consumption of fruit and vegetables in young children that children who met fruit recommendations are lacking diversity and one-third of fruit is from non-100% fruit juice (Ramsay et al., 2014). It is important for children to eat different types of foods such as milk, cheese, eggs, fruits and their juice, and all kinds of vegetables to meet various macro- and micronutrients for proper growth.

Eating vegetables is a concern for many people, as most children do not meet vegetable intake recommendations. Based on the USDHSS and USDA (2015), the consumption of vegetables reduced from 2001-2004 to 2007-2010 among all people in the U.S., and it was widely observed among the children. Among children who are ages 4-8 years only Less than 5% of them have met the recommended daily intake of vegetables, and among children who are ages 9-13 years only 1% have met the recommendations (USDHSS and USDA, 2015).

Based on a study conducted (2010) to determine the proportion of the U.S. population who do not meet federal dietary recommendations, even though most children met the recommendation of total grains, about 99% of children aged 4-13 did not consume whole grains (Krebs-Smith et al., 2010). Also, the recommended intake of dairy has not met by children ages 8-18 years old, so most of them also did not meet the recommendation of Vitamin D, calcium, and potassium (Keast et al., 2015; Hess & Slavin, 2014). Previous studies suggest that the biggest barriers to healthful eating among most children are what is available and allowable at home and at school, and a lack of nutrition education (O'Dea, 2003; Ying-Ying, et al., 2009). It is a big concern that children do not meet the macronutrients and micronutrients recommendations as their bodies need these nutrients for optimal growth.

Dietary intake for youth in Saudi Arabia

Based on a cross-sectional study conducted in 2007, in different regions of the capital city of Riyadh among 5033 boys and 4400 girls between the ages of 10 and 19 in order to examine the dietary habits in Saudi school children (using Food Frequency Questionnaire) and to make sure whether these dietary habits are associated with obesity

or not, the consumption of fruits, vegetables, and milk among Saudi schoolchildren is very low, while the consumption of fast foods, high-fat foods, sugary foods, and carbonated drinks is common among them (Collison et al., 2010). Also, the same study showed that poor dietary choices including sugar-sweetened carbonated beverages, frequent desserts, savory snacks, and total sugar consumption, as well as lower milk consumption, are associated with higher BMI, and this explains why Saudi children have a high prevalence of obesity (Collison et al., 2010).

During the years 2009-2010, a school-based cross-sectional study was conducted in three cities: Al-Khobar, Jeddah, and Riyadh. The study targeted 2908 secondary-school students aged 14-19 years. A questionnaire was used to evaluate students' dietary habits. The result showed that it is common among students not to eat breakfast and their diet was high in sugar and fat rather than fiber and nutrient-dense foods such as fruits and vegetables (Al-Hazzaa et al., 2011). Also, the result showed that the mean intake of fruits and vegetables per week among adolescents aged 14–19 years in Riyadh was 2.82 and 3.79 respectively; and the mean of their intake of sugar-sweetened drinks and sweets per week was 4.74 and 3.62 respectively (Al-Hazzaa et al., 2011). A result of another study conducted to determine the eating habits and lifestyle of 107 randomly selected female adolescent students [age 12-15 years] at schools in Riyadh showed that only 0.99% of students preferred eating fruits and vegetables, 36.63% of them preferred chocolate, and 39.6% of them preferred chips (Al Muammar and El Shafie, 2014).

Mansour and Alhadidi conducted a study to assess the status of vitamin D in children living in Jeddah, Saudi Arabia. The study was conducted from October through December 2010 among 510 healthy children aged 4–15 years. The result showed that

72.55% of children were suffering from vitamin D deficiency. Also, Mansour and Alhadidi stated in their study that the reason behind vitamin D deficiency among children in Saudi Arabia may be the result of low dietary intake and inadequate exposure to sunshine (Mansour and Alhadidi, 2012).

A study conducted by Gari 2008, to study the status of iron-deficiency anemia among 123 female children (age 6-12 years) in Jeddah, Saudi Arabia showed that the prevalence of iron-deficiency anemia in Jeddah was 35.8% where children's hemoglobin was <11.0 g/dL based on the WHO's definition for anemia which is Hb < 11.0 g/dL; also, the result showed that children who did not eat green vegetables had a higher prevalence of iron-deficiency anemia (Gari, 2008).

Physical activity recommendations for youth

According to the World Health Organization (WHO), people who are physically inactive are at high risk of noncommunicable diseases (cancer, heart disease, stroke, and diabetes) by 20–30% and shortens lifespan by 3–5 years. According to the CDC (2020), children should be physical activity for at least 60 minutes per day. Unfortunately, "more than 80% of the world's adolescent population is insufficiently physically active" (WHO, 2018). While the physical activity of adolescents aged 12-19 is low and they often exercise only from 26 to 33 minutes a day, the National Health and Nutrition Examination Survey (NHANES) has shown that younger children aged 6-11 years exercise more than the recommended levels where they often exercise about 88 minutes a day (Belcher, et al., 2010). Based on a cross-sectional study conducted by Belcher and colleagues (2010) that targeted 3106 children aged 6-19 years in order to describe physical activity (PA) levels and weight status in a representative sample of US youth,

children who are obese engaged in approximately 48 or 43 minutes of moderate to vigorous physical activity in comparison to children who have normal weight engaged in approximately 59 minutes of moderate to vigorous physical activity per day (Belcher, et al., 2010).

Physical activity levels of youth in Saudi Arabia

According to a study conducted by Al-Hazzaa (2004), that aimed to summarize the benefits of physical activity in health promotion and disease prevention, most of the population of Saudi Arabia lacks physical activity, where WHO estimates indicate that more than 55% of Saudi children and more than 70% of Saudi youths were physically inactive (Al-Hazzaa, 2004).

Based on the results of a school-based cross-sectional study was conducted among 2908 secondary-school students aged 14-19 years during the years 2009-2010 in three cities: Al-Khobar, Jeddah, and Riyadh, half of the males and three-quarters of females who participated in the study do not meet the daily physical activity guidelines, where 84% of males and 91.2% of females using television and smart devices (such as mobile phones) more than 2 hours daily. This indicated that most Saudi adolescents have sedentary behaviors and physical inactivity which is a major public health concern (Al-Hazzaa et al., 2011).

A result of a systematic review of 65 articles that conducted to examine the major barriers and correlates of physical activity in Saudi Arabia showed that there are some barriers that make most Saudi people are physically inactive such as increased urbanization, lack of social support, extreme weather, crowded traffic, the absence of

female school physical activity program, and lack of time and resources (Al-Hazzaa, 2018).

School Environment

Children spend more than seven hours in school, so the school environment is considered an important factor that affects children's health behavior. United States Department of Agriculture (USDA) (2013), the school environment can be healthy if applied new school meal standards from the Healthy, Hunger-Free Kids Act. According to the Academy of Nutrition and Dietetics (2010), schools have a major role in promoting children's health, so all school health programs should include a comprehensive nutrition program to improve students' health and nutritional status, and this will contribute to improve the academic performance of students. Previous studies have proved that nutrition education in schools, active student engagement, and active parental involvement play a major role in increasing fruit and vegetable consumption in children (Knai et al., 2006).

As for physical activity, there is a need to increase interest in physical activity in schools. According to The National Coalition for Promoting Physical Activity, an organization aimed at advocating for policy that increases physical activity, since 1989, 90% of the schools have had enough time for the break which contributed and allowed students to play and run and do some physical activity, but since then about 40 of these schools have reduced or canceled the rest time in favor of the time of education; this is explained the reasons for the decrease in physical activity in schools.

Teachers may play an important role in influencing student behavior. Previous literature studies have proved that teachers not only affect students' academic skills but

also affect their social skills and behavior (Meece & Eccles, 2010). It has been shown in the American Heart Association childhood obesity research summit that the teacher behaviors performed in front of students affect their behaviors (Donnelly et al., 2009). For example, if the teacher does any sports activity in front of the students, this will increase the chances of the students doing that activity (Donnelly et al., 2009). Perikkou et al. (2013) found in their study of 218 elementary school students aged nine years, evaluating the effectiveness of a school-based intervention for increasing children's fruit intake using the teacher as an exposure model found that the interventions including nutritional education, a snack of fruit provided to students weekly, with consuming the teachers the same snack of fruit in front of the students led to a significant increase in students 'consumption of fruits.

School-Based programs

Although many interventions have been made regarding improving the nutrition or physical activity of students in schools, there is no specific or clear way to improve behavior yet. There are some interventions and studies that have brought about positive changes in weight behaviors and lifestyles among students, but also there are other interventions and studies that have not brought any changes among students, so it is not possible to define a specific intervention or an optimal way to affect the behavior (Peterson & Fox, 2007).

Based on a result of a study conducted in an urban elementary school to study the knowledge and behavioral change following nutrition education among students, the nutrition lessons greatly increase nutrition knowledge among students but does not cause any behavior change (Blom-Hoffman & DuPaul, 2003). Even though many studies have

proved that nutrition education improves students' food habits, there are some studies that have proved that nutrition education is not the best approach to prevent obesity among children. A study conducted by Stice, Shaw, and Marti (2006) to study 13 obesity prevention programs using nutrition education intervention showed that 80% of these programs did not have a statistically significant effect on weight gain, and these programs are unable to produce long-term effects to prevent weight gain among children and adolescents.

According to the American Academy of Pediatrics (2014), in order to increase the effectiveness of the school nutrition programs, parents should participate and support the nutritional education efforts being made in the school such as provide nutritional snacks at home. There is some evidence that based on who is teaching the nutrition lessons or the type of teaching (Ex., lessons in class, a trip to garden/ farm, or using games) the dietary intake of children is affected, so in the field of nutrition education among children, it is important to focus on the people and places that affect the nutrition environment of children such as schools and parents. (USDA, 2012; USDHHS, 2010). To influence children's healthy eating behaviors, parents, schools, and communities should contribute and offer a healthy environment that supports healthy eating and physical activity (CDC, 2011).

School-Based Obesity Control in Saudi Arabia

In 2017, the Ministry of Health, in cooperation with the Ministry of Education, started an initiative to reduce obesity rates in schools by raising awareness, creating a database, providing a supportive environment, enforcing regulations and laws related to balanced food, physical activity, and fighting obesity at school age. The detailed aims of

this initiative are to improve nutritional behavior and physical activity for students and to provide preventive and curative services for obese students. The main goal is that the obesity rates among school-age children between the selected schools will be reduced by 5% by the end of the year 2020. The initiative has been implemented in four phases. Each phase is implemented over an entire academic year. The first phase started in 2017 and targeted 1000 schools in six different regions in Saudi Arabia and the second stage in 2018 and targeted 2400 schools in 20 different regions in Saudi Arabia and the third stage in 2019 and targeted 4000 schools in 20 regions in Saudi Arabia and the last stage is still under application as it started with the beginning of 2020 and it is targeting 6000 schools in 20 regions in Saudi Arabia (Ministry of Health, 2019).

This initiative targets school students, educational staff in schools, parents and health staff in the health care center. In 2019, the initiative was implemented in 4,000 schools (elementary, intermediate, and secondary schools) in 20 different regions in Saudi Arabia. One of the achievements made during this year was 987 primary healthcare centers have been linked with the schools, which in turn has formed a working group for the initiative in each school, prepared the implementation plan for the initiative inside the schools and its implementation, coordinated with the health center to train educational cadres inside the schools. It also carried out health awareness activities inside the school, participated in inspecting and monitoring the environment school (canteens/playgrounds), and took the necessary steps towards improving them. Moreover, it activated supportive systems to enhance lifestyles for physical activity and healthy food, involved the community surrounding the schools, did the school health services for the initiative

(weight, height, index) Body mass, follow up of transferred cases), and prepared the periodic reports (Ministry of Health, 2019).

Also, in 2019, 1824 health cadres and 3,705 educational staff have been trained on taking measurements of height and weight, measuring body mass of students, and implementing activities and health education to raise awareness among students. The educational and health staff conducted lectures, seminars, and awareness-raising activities on obesity control to educate students about obesity risk and educate them about healthy eating and teach them some healthy meals that contain all food groups (grains, dairy products, fruit, vegetable, and protein) and appropriate quantities for each student as the needs differ from person to another according to height, weight, and physical activity. Moreover, in the same year, 1,073,270 students were screened based on their body mass index and follow up with all cases that have been found to be obese. The cases found to be obese or overweight were followed up by establishing periodic meetings to educate students and their families about healthy eating habits and appropriate exercise, referring cases that require medical care, such as those with diabetes to the nearest health care center, and establishing a periodic schedule for taking measurements (ex: weight and waist circumference). In addition, 4,014 target school canteens have been evaluated to ascertain whether or not they meet the health requirements of the school cafeteria in Saudi Arabia, which include certain criteria for canteen space and hygiene, ways to preserve and store foods, and foods permitted or not permitted (Ministry of Health, 2019). For example, any packaged product that does not contain the food label in compliance with the nutritional requirements or any product with deficient nutritional properties is not permitted. Also, it is forbidden to sell drinks

that contain caffeine (such as soft drinks and energy drinks), foods and drinks that are rich in sugar, salts, and saturated fats (such as fried potatoes, chips), and foods and drinks that contain colorings and dyes (such as candy). Hopefully that the results of the initiative will be positive and achieve its goal and be the beginning and the starting point of many programs of intervention in schools in Saudi Arabia.

Theoretical Framework

Social Cognitive Theory.

Social Cognitive Theory (SCT) is one of the most widely used theories in behavior change interventions. It enables people to study factors affecting a person's healthy behaviors such as individual experiences, the actions of others, and environmental factors (Glanz & Bishop, 2010; Glanz et al., 2008). This theory is often used when the audience is young or low-income because it studies environmental factors that can play a major role in. Education and knowledge will not succeed if the environment is not equipped for change. Also, to enable people to study all the factors that affect the behavior change, some of the basic components of the theory have been incorporated and they are self-efficacy, behavioral capability, expectations, expectancies, self-control, observational learning, and reinforcements (Glanz et al., 2008; Bandura, 2004).

Previous studies have demonstrated the effectiveness of the SCT in behavior change. For example, the theory was applied in a study that targeted children aged 3-6 years old to increase the consumption of vegetables and fruits. The results showed that the consumption of vegetables and fruits increased among children and this change continued for more than 18 months after the intervention (Bayer et al., 2009). Also, a

systematic review study conducted to review the interventions on children aged 4-6 years old found that interventions that used SCT were very effective in losing weight and change physical activity and diet among children (Nixon et al., 2012).

Social-Ecological Models (SEMs).

Social-ecological models (SEMs) are used to clarify the relationships between persons and their environments (Golden, et al., 2015). In 1976, SEMs were created to illustrate how the environment relates to the development of people and how this relationship is influenced by the individual throughout his life (Hess & Schultz, 2008). The theory indicates that the environment consists of several levels that affect behavior and to ensure the effectiveness of the intervention, individuals and their environment must be compatible. For example, face-to-face interactions with family and friends can affect a person's behavior; at the same time, values and culture within society also can affect behavior, so if the family/friends and society support the intervention this will facilitate the success of the intervention (Green et al., 1996).

SEM's have been applied in many studies that have been done to evaluate school-based programs and interventions in different issues. For example, the SEMs were used in a study about bullying in schools conducted in 2001 by Swearer and Doll. The used of the SEMs enabled researchers to study and know all the factors that contribute to bullying and prove that bullying is a result of the individual characteristics of bullies in addition to the actions of others such as family, peers, teachers, and administration. The results found that a family that allows bullying contributes to the character of its bully child. Also, teachers can contribute to the occurrence of bullying when they leave locations without supervision, and the administration contributes to bullying when it does not provide

adequate supervision (Swearer & Doll, 2001). Also, the SEM's were used in another study conducted by Gregson et al. (2001) to evaluate nutrition education and social marketing programs with low-income audiences, and the result found that a community supporting nutrition education (EX. providing free lessons or hanging educational leaflets on the street) contributes to improving the nutritional status of community members (Gregson et al., 2001).

Literature Gaps

Although the education authorities and policymakers in Saudi Arabia started newly with interest care about the school health services including school nutrition education, there is a gap and need for studies that evaluate the quality of nutrition education in schools in Saudi Arabia. There are only a few studies that have examined students' knowledge about nutrition and eating habits. A cross-sectional study conducted in Al-Khobar, in the eastern region, and targeted a sample of male (n=1240) and female (n=1331) adolescents aged 15-18 years found that most students who participated in the study did not have adequate knowledge about energy-dense foods (such as foods high in saturated fat), and nutrient-dense foods (such as those rich in fiber); the study also showed that most of these students get their nutritional information from social media and primary health care centers (Al-Almaie, 2005). These results suggest that there is a need to implement nutrition intervention programs in schools to raise knowledge and awareness among Saudis, and the best place for this is primary schools where children acquire knowledge from childhood and work throughout their lives.

There are few published studies assessing nutrition education programs in primary schools in Saudi Arabia, and most results of these studies confirmed this there is a lack or

nonexistence of school-based nutrition programs in Saudi Arabia, so teachers, parents, and children do not get nutrition education, training, and learning resources (Eid, 2018). In a cross-sectional study conducted in 2013 among 10 elementary schools that were randomly selected in Al-Baha in Saudi Arabia, the results showed that all the schools that have been included in the study (n=10) did not have any nutritional educational programs or any teacher or others are responsible for nutrition matters in the schools. Also, this study included 725 school children aged 7-12 years to answer the questionnaire and collect the required information, and a few of them mentioned that they have been received information about healthy nutrition (55.8 %), and about healthy methods to gain or lose weight (11.6%- 17%, respectively) in schools. Moreover, most of the students who participated in the study stated that their families (64%) and social media (59%) are the primary source of nutrition education, followed by the school (54%) and friends (24%), and 96% of them stated that they need nutrition education programs in schools (Alsubaie, 2017). Moreover, only one study conducted in 2015 to study teachers' perspectives on nutrition education and teaching it in Saudi Arabia. The study targeted 80 teachers from 80 boys' public high schools in Riyadh and a questionnaire was used to interview them. The result showed that as a result of lack of training and teaching materials, teachers' confidence in delivering nutrition education was affected even though they were interested in teaching nutrition (Aldubayan, 2019). Therefore, there is a need to conduct more studies to study the needs and the quality of nutrition education in schools in Saudi Arabia.

Chapter 3: Methodology

Study Setting

This cross-sectional study assessed the teachers' perspectives and confidence about the nutrition education offered in three elementary all-female government schools in Jeddah, Saudi Arabia (1). Wellness policies in 12 elementary all-female government schools in Jeddah, Saudi Arabia were evaluated, including the three schools in which teachers' perspectives and confidence were assessed (2).

Jeddah is a large, metropolitan city in western Saudi Arabia with a population of over 3.4 million people. In 2017, the number of elementary all-female government schools in Jeddah was 6322 (Saudi General Authority for statistics, 2020). Elementary is considered the first stage of general education in Saudi Arabia, as the student starts the elementary stage from the age of 6 years and stays in this stage for six years. The most prominent subjects that are taught to the student at this stage are the Arabic language, religion, mathematics, science, arts, and English.

(1) The teachers' perspectives and confidence about the nutrition education.

Sample.

This study included a convenience sample of three primary schools. Schools invited to participate were elementary all-female government schools. The school principals were contacted, and the approval was received orally to participate in the study. School principals were asked to invite all of their teachers (n=140) to participate in the study. Participation was voluntary and did not include any special populations.

Data Collection.

All three school principals received two links to electronic surveys that were created by Qualtrics (https://www.qualtrics.com) which is a software that enables users to conduct online data collection and analysis. The first survey was for the school principals and the other for teachers (Appendix A). The first page of the surveys was representing the consent form where it was included information about the research (such as the purpose, the risk, and the benefits) to give the participants a better understanding of the topic. Clicking the button below the page to start the survey was considered an approval.

All teachers received a link to the survey by a text message that the principals sent. The survey was designed based on surveys that have been used in a previous project to evaluate the outcomes of the team nutrition initiative in schools, and the initiative was "a voluntary USDA school-based initiative to promote nutrition education, healthy eating, and physical activity" (Murimi et al., 2006), and it was modified to fit the Saudi dietary guidelines. Responses were provided anonymously, and no identifying information was collected from participants.

Survey Development.

The survey included four sections to assess the teachers' perspectives and confidence in nutrition education.

1. The first section was about the characteristics of the teachers (age, education level, the subject that teachers are teaching, and the years of experience).
2. The second section was included questions about the teachers' perspectives on teaching nutrition.
3. The third section was included statements about the teachers' confidence in teaching nutrition.
4. The fourth section was about the school health services and was include some yes/no questions, multiple-choice, and choose all the correct answers.

A four-point Likert scale (strongly disagree, disagree, agree, and strongly agree), which is a rating scale that has been developed to measure how much people agree or disagree with a particular statement (McLeod, 2019), was used in the second section, and a four-point Likert scale (not at all confident, not confident, confident, and very confident) was used in the third section to allow the teachers to express how much they agree or disagree/confident or not confident with particular statements.

(2) The schools' wellness policy survey.

Sample.

This study included a convenience sample of 12 principals from different elementary all-female government schools, where they were invited to participate in the study by one of the principals of the schools that was contacted previously in order to

invite all of their teachers to participate in the study. Participation was voluntary and did not include any special populations.

Data Collection.

All 12 school principals received a link to electronic survey that was created in Qualtrics and designed to provide information about the school's wellness policy by a text message that the principal sent it.

The content of the Survey.

The survey included some text-entry questions and Yes/No questions as shown in appendix A.

Data Analysis

Data was entered, edited, and analyzed using version 25 of the Statistical Package for the Social Sciences (SPSS 25), which is a software that offers advanced statistical analysis of data (IBM, n.d.). The differences between teachers' perspectives and confidence level and their characteristics (such as age, education level, the subject that teachers are teaching, and the years of teaching experience) were analyzed using the Fisher exact test. The Fisher exact test is "an inferential statistical procedure to compare the number of people or things falling into different categories" (Frey, 2018). The P-value less than 0.05 was considered statistically significant. The research was approved by the Institutional Review Board of Eastern Illinois University.

Chapter 4: Results

School Wellness Policy Survey

Principals from 12 different schools started the survey, and 11 of them completed it. The number of students and teachers in each school varied ranging from 273 to 1000 students. The number of teachers ranged between 23 to 48 as shown in Table 1.

Table 1

Number of Students and Teachers at Each School Included in the School Wellness Policy Survey

Schools (N=11)	Number of students	Number of teachers
School 1	842	48
School 2	485	46
School 3	589	31
School 4	398	40
School 5	498	36
School 6	700	46
School 7	470	46
School 8	661	35
School 9	273	24
School 10	450	23
School 11	1000	40

Note. N=Number of schools

Schools wellness policies.

Nearly (n=10; 91%) of the principals stated that their schools had a formal school wellness policy, and all of them (n=11; 100%) stated that there was a wellness coordinator in their schools responsible for discovering and following up on the students' health (Table 2). The wellness policy that used at all schools includes following up health cases of students who suffer from any special health condition or disease (such as heart disease, diabetes, or obesity), providing health advisory programs, hosting specialized medical cadres to spread health awareness among students. Also, it includes providing

time and opportunities for physical activity. Moreover, it includes doing daily inspections of foods that served in the cafeteria including expiry date and not selling any prohibited products such as candies, etc. It also includes inspecting the hygiene of cafeterias such as checking the cleanliness of the place, tools used to store food, and good ventilation, etc.

Educational resources and opportunities to teach nutrition education.

Out of 11 principals who completed the survey, seven (n=7; 63.6%) had participated in a prevention and awareness training (or qualifying workshops) related to healthy nutrition at the school, and five (n=5; 45.5%) had participated in a preventive and awareness training (or qualifying workshops) related to physical activity at the school. Moreover, ten (n=10; 90.9%) stated that staff in their schools was provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about nutrition, including how to integrate it into the core instruction, and nine (n=9; 81.8%) stated that staff in their schools were provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about physical activity, including how to integrate it into the core instruction. In regard to the materials and resources that necessary to provide current nutrition education in the classroom, seven of the principals (n=7; 63.6%) stated that teachers in their schools had adequate materials and resources to provide current nutrition education in the classroom, as it is shown in table 2.

Table 2

Principals' Perspectives About Resources Available to Teachers to Teach Nutrition Education at Their Schools

Total	N=11	
Questions that were included in the survey	Yes	No
Does your school have a formal school wellness policy?	10 (90.9%)	1 (9.1%)
Is there a wellness coordinator in the school, who is responsible for discovering and following up on the students' health?	11 (100%)	0
I have participated in preventive and awareness training (or qualifying workshops) related to healthy nutrition at the school.	7 (63.6%)	4 (36.4%)
I have participated in preventive and awareness training (or qualifying workshops) related to physical activity at the school.	5 (45.5%)	6 (54.5)
Staff is provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about nutrition, including how to integrate it into the core instruction.	10 (90.9%)	1 (9.1%)
Staff is provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about physical activity, including how to integrate it into the core instruction.	9 (81.8%)	2 (18.2%)
Teachers have adequate materials and resources to provide current nutrition education in the classroom.	7 (63.6%)	4 (36.4%)

Note. N=Number of Principals

Teachers' Perspectives Survey

The characteristics of the teachers.

Out of 140 teachers from three schools, 61 (n=61; 43.6%) completed the questionnaire. Most of the teachers were between 30-40 years old (n=29; 47.5%) and 41-50 years old (n=22; 36.1%). Most teachers had a bachelor's degree (n=49; 80.3%). Many teachers who completed the survey taught more than one subject or religion (n=12; 18.5% and n=11; 16.9% respectively), and half of the teachers (n=30; 50%) had teaching experience of more than ten years (Table 3).

Table 3

Characteristics of the Teachers Who Completed the Teachers' Perspectives Survey

The characteristics of the teachers (N=61)	Results	
Age (years)	< 30	3.3%
	30–40	47.5%
	41–50	36.1%
	> 50	13.1%
Education level	Bachelor's degree	80.3%
	Diploma	18%
	Master's degree	1.6%
	Ph.D.	0%
The subjects taught by teachers	Sciences	10.8%
	Arts	6.2%
	Math	10.8%
	Religion	16.9%
	Arabic	13.8%
	English	3.1%
	Social studies	12.3%
	More than one subject	18.5%
Years of teaching experience	< 3	0%
	4–6	15%
	6-10	36%
	> 10	50%

Note. N=Number of Teachers

Teachers' perspectives about resources for teaching nutrition.

As for the teachers' perspectives on teaching nutrition, (n=32; 55.2%) of the teachers agreed that adequate resources were available to them in the school to teach nutrition; however, (n=26; 44.9%) of the teachers were not agreed. Also, (n=34; 58.6%) of the teachers agreed that they have had adequate training from qualified people on nutrition education. Moreover, (n=51; 87.9%) of the teachers were agreed that they were aware of the food pyramid, and (n=28; 48.2%) of them were aware of the healthy Food Palm (Table 4).

Table 4

Teachers' Perspectives About Resources/ Training Available to Them for Teaching Nutrition at Their Schools and Their Knowledge of the Food Pyramid/the Healthy Food Palm

Total (N=61)	SA	A	Total (SA/A)	D	SD	Total (D/SD)
Adequate resources are available to me in the school to teach nutrition	15.5%	39.7%	55.20%	39.7%	5.2%	44.9%
I have had adequate training from qualified people on nutrition education	17.2%	41.4%	58.60%	37.9%	3.4%	41.3%
I am aware of the food pyramid	34.5%	53.4%	87.90%	12.1%	0%	12.1%
I am aware of the healthy Food Palm	10.3%	37.9%	48.20%	44.8%	6.9%	51.7%

Note. SA= Strongly Agree, A=Agree, D=Disagree, SD=Strongly Disagree

N=Total of teachers

Teachers' confidence in teaching nutrition.

Most of the teachers (n=54; 94.7%) reported that they were confident that they know what healthy food was well enough to teach it to their students, and (n=49; 86%) reported that they were confident that they know what a physical activity was well enough to teach it to their students. Also, most of the teachers (n=52; 91.2%) were confident in their ability in teaching their students what the food pyramid, and more than half of the teachers (n=35; 61.4%) were confident in their ability in teaching students what the healthy Food Palm. A majority (n=53; 92.9%) of the teachers reported that they were confident that they can do a good job teaching students about reducing fat, sugar, and salt in their diet, and all teachers (n=57; 100%) reported that they were confident that they can do a good job teaching students about increasing fruits, vegetables, grains, and milk in their diet. In general, teachers who taught more than one subject were more confident in teaching nutrition than others (Table 5).

Table 5

Teachers' Confidence in their Ability to Teach Healthy Eating Habits and Physical Activity to Students

Total (N=61)	VC	C	Total (VC/C)	NC	NAAC	Total (NC/NAAC)
I know what healthy food is well enough to teach it to students	29.8%	64.9%	94.70%	5.3%	0%	5.3%
I know what a physical activity is well enough to teach it to students	19.3%	66.7%	86.00%	14%	0%	14%
I can do a good job teaching student what the food pyramid is	17.5%	73.7%	91.20%	8.8%	0%	8.8%
I can do a good job teaching student what the healthy Food Palm is	12.3%	49.1%	61.40%	33.3%	5.3%	38.6%
I can do a good job teaching student about reducing fat, sugar, and salt in their diet	33.3%	59.6%	92.90%	7%	0%	7%
I can do a good job	40.4%	59.6%	100.00%	0%	0%	0%

teaching student about increasing fruits, vegetables, grains, and milk in their diet

Note. VC=Very Confident, C=Confident, NC= Not Confident, NAAC= Not at All Confident

N=Total of teachers

The school health services.

The school health services were the last section in the survey, and most of the teachers (n=52; 91.2%) agreed that there are healthy eating and physical activity messages displayed within the buildings (e.g., posters), and (n=53; 93%) agreed that schools provided activities to enhance students' physical activity. Also, most of the teachers (n=48; 94.1%) reported that endurance exercises (ex. jogging or playing tennis) were the activities that the schools provide for students, and (n=40; 78.4%) of them reported that < 30 min was the duration of the activities, on average. In regard to the food items offered in the schools' cafeteria, most teachers reported that 100% fruit juice, non-fat or low-fat dairy products (milk, cheese, or yogurt), and salad were the most food that offered in the schools' cafeteria (n=18; 27.7%, n=16; 24.6%, and n=13; 20% respectively) (Table 6).

Table 6

Teachers' Perspectives on Their Schools Health Services (Healthy Message Displays, Physical Activity Options, Healthy Food Availability in the Cafeteria of Their Schools)

Total (n=61)	n	%
Healthy Messages Displayed		
Yes	52	91.2
No	5	8.8
School Provides Physical Activity Options		
Yes	53	93
No	4	7
Activities provided for students		
Endurance (Ex. jogging or playing tennis)	48	94.1
Strength (Ex. lifting free weights)	0	0
Flexibility (Ex. doing yoga)	2	3.9
Balance (Ex. standing on one foot)	1	2
Average Duration of Physical Activity Options		
< 30 min	40	78.4
30 min - 60 min	11	21.6
> 60 min	0	0
Food Items Offered in the Cafeteria		
Salad	13	20
Fresh fruit	8	12.3
Fresh vegetables	2	3.1
Other fruit (dried, canned)	1	1.5
100% fruit juice	18	27.7
Non-fat or low-fat dairy products (milk, cheese)	16	24.6

Note. n=Number of Teachers

Associations between teachers' characteristics and their perspectives and confidence level in teaching nutrition

Associations were evaluated between teachers' characteristics (age, education level, the subject that teachers are teaching, and the years of teaching experience) and their perspectives and confidence level in teaching nutrition (Appendix C). A significant relationship was found only between one statement (Adequate resources are available to me in the school to teach nutrition) and teachers' age (P-value <0.05), and not between any other statements/questions and characteristics (Appendix C). Teachers who were between 30-50 years old were the largest group who agreed that there were adequate resources available to them in the school to teach nutrition. In contrast, all teachers whose age was more than 50 years old disagreed that there were adequate resources available to them in the school to teach nutrition (Table 7). Overall, teachers whose age was between 30-50 years old were more interested in teaching nutrition.

Table 7

The Relationship Test Result Between Teachers' Age and Their Perspectives about Resources Available to Them to Teach Nutrition at Their Schools

Age	Adequate Resources are Available to Me in the School to Teach Nutrition		Fisher Exact Test
Years	Agree	Disagree	
< 30	1	1	*P* value = 0.016
30–40	16	11	
41–50	15	7	
> 50	0	7	

Note. A P-value < 0.05 considered statistically significant

Chapter 5: Discussion

The purpose of this study was to evaluate the content of school wellness policies and understand teacher perspectives about teaching nutrition education at their schools in Jeddah, Saudi Arabia. Data of the teachers' perspectives and confidence about nutrition education was collected using a survey from 61 teachers who are working in three elementary all-female government schools in Jeddah, Saudi Arabia, and another survey was used to collect wellness policies data from 11 principals of 11 elementary all-female government schools in Jeddah, Saudi Arabia.

The results of this study indicated that all 11 schools have wellness policies that aimed to raise health awareness among students and teachers, provide and facilitate students' access to healthy, balanced food, and provide access to physical activity. Also, all schools (n=11) have a wellness coordinator in their schools who is responsible for discovering and following up on the students' health. It has been proven that comprehensive wellness policies in schools contribute to preventing and reducing childhood obesity and promoting student wellness overall (USDA-FNS, 2019). Also, the results showed that most principals stated that they participated in workshops related to healthy nutrition and physical activity at the school. Also, out of 11 principals, ten of them stated that staff in their schools is provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about nutrition and physical activity, including how to integrate it into the core instruction. These results highlight the efforts made to implement and develop nutrition education programs in schools in Saudi Arabia. However, we cannot generalize these results to all schools in Saudi Arabia, as this study was conducted on 11 elementary schools in Jeddah

only. It is important that all schools establish and develop nutritional education because of its importance in improving nutritional behavior that affects children's growth, health, intellectual development which contributes to improving their academic performance (CDC, 1996; WHO, 2006).

Teachers play a major role in affecting children's social skills and behavior where children are greatly affected by teachers as role models. Therefore, teachers are greatly contributing to raising the level of knowledge and changing behavior among children (Meece & Eccles, 2010; Hall, 2015). This study found that most teachers were believed they had adequate resources available to them to teach nutrition in the schools, and they had adequate training from qualified people on nutrition education. Most teachers were confident in teaching nutrition and physical activity to their students. These results suggest that teachers might be motivated to teach nutrition education at the schools, as long as, they have the opportunity to train and the teaching materials are available to them. However, more research would be needed (in other areas, using randomization methods to avoid bias, etc.). The results showed that all teachers (100%) reported that they were confident that they can do a good job in teaching students about increasing fruits, vegetables, grains, and milk in their diet. There is a great possibility that this question was misunderstood by some of the teachers. The purpose of this question was not only to assess their ability to advise students to eat fruits, vegetables, milk, and grains in abundance, but also to assess their ability to teach students the appropriate amounts that their bodies need from these elements daily. Also, the results showed that few teachers stated that they were aware of the Healthy Food Palm (48.2%), unlike the food pyramid most teachers were aware of it (87.9%) although the Healthy Food Palm was

produced since 2012 by the Saudi Arabian Ministry of Health to be used in nutrition education. This indicates that there is a need to increase teachers' awareness of the healthy Food Palm.

World Health Organization stated in its report (2006) that, most children and adolescents are ignorant of the basic skills of following a healthy diet and tend to eat fast food with high calories and poor nutritional content which leads to gain weight. Therefore, school-based nutrition education is very important especially early in childhood to help them following a healthy lifestyle that ensures that they grow healthy. According to WHO (2006), nutrition education in schools is not only affecting and enhance children's dietary behaviors, but it also affects the dietary behaviors of families and community members. Also, it has been proved that school nutrition education greatly affects and enhances health nutrition behaviors among children and adolescents (WHO, 2006). Therefore, the schools' environment must be highlighted by policymakers to implement and develop effective extension programs on nutrition.

Children spend about 7 hours in school, and about 35-47% of their daily dietary intake is consumed at school (Briefel et al., 2009). Therefore, it is important that all schools offer healthy school environments for students that ensure facilitating their access to healthy, balanced food, and enhancing their physical activity, thus, promoting their overall health. The results of this study showed that the schools are supporting and offering healthy environments for students where most teachers (<90%) were agreed that where there are healthy eating and physical activity messages displayed within the buildings (e.g., posters). Also, schools provide activities to enhance students' physical activity, they serve healthy and balanced meals in the cafeterias. These results indicate

that schools provide a healthy environment and services that help students follow a healthy lifestyle, but the question is, do students benefit from these services? There is a need for more studies that examine the effectiveness of these services and whether or not they meet the needs of students. When the environment is not supportive and equipped to help and facilitate people's behavioral changes, education in making healthy choices is less effective (Nam, 2016). Therefore, to ensure improved health awareness and nutritional status among students, the school health programs should include comprehensive, integrated nutrition services.

The present study showed that there was only one significant relationship between teachers' characteristics and their perspectives and confidence level in teaching nutrition. It was between teachers' ages and their perspectives level in regard to this statement "Adequate resources are available to me in the school to teach nutrition". The results showed that teachers whose age is between 30-50 years old were the most groups who agreed that there are adequate resources available to them in the school to teach nutrition. Also, the results showed that all teachers whose age is more than 50 years old disagreed that there are adequate resources available to them in the school to teach nutrition. This might be due to the fact that technology has become an integral part of the educational system and has become the main reference for all educational sources and information, and it has been proved that younger adults adapt to the new technologies faster than older adults (Czaja et al., 2006).

It has been demonstrated that family, friends, values, and culture within a society affect a person's behavior and choices, so to facilitate the success of the intervention, the family/friends and society should support the intervention (Green, Richard, & Potvin,

1996). For example, if an intervention is made in a school for the purpose of raising awareness of the importance of exercises among students, the school must provide students with places and times dedicated to exercises. In order to understand all factors that contribute to children's dietary knowledge and behaviors, Social-ecological models (SEMs) were used to illustrate that the environment consists of several levels that affect behavior (Appendix B). In regard to children's eating behaviors, it has been found that parents' background and education strongly influence children's behaviors and attitudes. Also, surrounding physical and social environment (such as providing and facilitating the accessibility to healthy food) contributes to children's eating behaviors (Patrick and Nicklas, 2005).

Moreover, the media greatly contributes to children's knowledge of nutritional information where it has been reported that most students' knowledge of food and nutrition comes from the media (radio and TV) as the first source, followed by family/ friends, then schools (Charlton et al., 2004). The media is a double-edged sword that can be used in a positive or negative way. It can be used to send correct and important messages about nutrition that affect and reach children easily, but at the same time, anyone can send misleading and inaccurate information about nutrition that may affect children's behaviors. Therefore, there is a need to promote and monitor the nutrition information that sending in the media by policymakers and use the media in the correct way to raise awareness among people and improve health.

Three questions directed this study:

1. What are the services provided in schools to facilitate a healthy lifestyle for students?
2. What is the relationship between teacher characteristics and confidence in teaching nutrition education?
3. What is the teacher's knowledge of the USDA Food Pyramid and Healthy Food Palm?

Based on the results of this study, all schools in Saudi Arabia provide health services to facilitate and offer students a healthy lifestyle, teachers who are between 30-50 years old are more confident in teaching nutrition education than others, and the USDA Food Pyramid is known and used more than Healthy Food Palm among most teachers in Saudi Arabia. However, we cannot confirm this answer where the survey method was used to collect data, which might be subjected to over-informed or under-informed. Also, this study conducted on a small sample which means we cannot generalize the results. So, there is a need for more studies that use other and accurate methods (ex, doing in-person interviews) and use large samples to get accurate and confirmed answers. In general, the results of this study proved that primary schools in Saudi Arabia provide high-quality nutritional education, and as far as we know, this study is the first study that has proven this. Therefore, this study may be a catalyst for conducting many new studies in the field of nutrition education, which in turn may contribute to explore and overcome the obstacles and determinants of nutritional education in Saudi Arabia.

Limitation of the study

Although this study served its aim which is investigating the need for nutrition education in three elementary all-female government schools in Jeddah, Saudi Arabia was served, it has several limitations.

- First, we used convenience and small sample size, so we cannot generalize our results.
- Second, the data was based on a self-reported survey which may not accurately represent the valid responses, and this may affect the accuracy of the results.
- Third, this study focused only on all-female government schools located in Jeddah, Saudi Arabia. Therefore, our results cannot be generalized to schools in other cities in Saudi Arabia, to all-male schools, and to private schools.

Chapter 6: Conclusion and Implications

Conclusion

The purpose of this study was to evaluate the content of school wellness policies and understand teacher perspectives about teaching nutrition education at their schools in Jeddah, Saudi Arabia. Although the results of this study cannot be generalized due to the small sample size, valuable information was gained. Providing high-quality nutrition education in schools that ensures facilitate access for students to healthy food, practicing sports, and qualifying and training teachers to teach nutrition contributes to building healthy behavior among children and youth, and it protects them from future health problems and dangers. Also, families, communities, and governments should cooperate with schools to help and facilitate the success of schools' effort. Overall, the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia is high based on the results. However, the results of this study suggest that there is a need for more training and follow-up of teachers by qualified doctors or skilled nutritionists to achieve the target of prevention, protection, and health awareness among students.

Implication of research

The findings of this study may be beneficial to the Ministry of Health and Ministry of Education in Saudi Arabia regarding the importance of nutrition education in schools and exploring its barriers, correlates, and determinants. Moreover, the results of this study contribute to establishing nutritional education programs to improve the schools' wellness policy and to qualify teachers to teach students healthy nutrition and physical activity; thus, raising nutrition awareness among the people in Saudi Arabia, and raising the level of health and overcome many diseases. Additionally, the results of this

study become a reference for future research in the field of nutrition in Saudi Arabia.

There is a need for further studies investigating nutrition education in schools in Saudi Arabia.

References

Abdel-Latif, M. M., & Saad, S. Y. (2019). Health literacy among Saudi population: a cross sectional study. *Health Promotion International, 34*(1), 60-70. https://doi.org/10.1093/heapro/dax043

Academy of Nutrition and Dietetics. (2010). Comprehensive School Nutrition Services. Retrieved from http://www.eatrightpro.org/resource/practice/position-and-practice-papers/position-papers/comprehensive-school-nutrition-services

Al Dossary, S.S., Sarkis, P.E., Hassan, A., Ezz El Regal, M. & Fouda, A.E. (2010). Obesity in Saudi children: a dangerous reality. *EMHJ - Eastern Mediterranean Health Journal, 16*(9), 1003-1008. https://apps.who.int/iris/handle/10665/117995

Al Muammar, M. N., & El Shafie, M. (2014). Association between dietary habits and body mass index of adolescent females in intermediate schools in Riyadh, Saudi Arabia. *EMHJ-Eastern Mediterranean Health Journal, 20*(1), 39-45. https://apps.who.int/iris/handle/10665/118621

Al Shehri, A., Al Fattani, A., & Al Alwan, I. (2013). Obesity among Saudi children. *Saudi Journal of Obesity, 1*(1), 3-9. DOI: 10.4103/2347-2618.119467

Al-Almaie, S. (2005). Knowledge of healthy diets among adolescents in eastern Saudi Arabia. *Annals of Saudi Medicine, 25*(4), 294-298. https://doi.org/10.5144/0256-4947.2005.294

Al-Hazzaa, H. M. (2004). The public health burden of physical inactivity in Saudi Arabia. *Journal of Family & Community Medicine, 11*(2), 45-51.

Al-Hazzaa, H. M. (2018). Physical inactivity in Saudi Arabia revisited: a systematic review of inactivity prevalence and perceived barriers to active living. *International Journal of Health Sciences, 12*(6), 50-64.

Al-Hazzaa, H. M., Abahussain, N. A., Al-Sobayel, H. I., Qahwaji, D. M., & Musaiger, A. O. (2011). Physical activity, sedentary behaviors and dietary habits among Saudi adolescents relative to age, gender and region. *International Journal of Behavioral Nutrition and Physical Activity*, *8*(1), 140. https://doi.org/10.1186/1479-5868-8-140

Al-Hazzaa, H. M., Alahmadi, M. A., Al-Sobayel, H. I., Abahussain, N. A., Qahwaji, D. M., & Musaiger, A. O. (2014). Patterns and determinants of physical activity among Saudi adolescents. *Journal of Physical Activity and Health, 11*(6), 1202-1211.

Aldubayan, K. (2019). Teachers' perspectives on nutrition education and teaching it in boys' public high schools in Riyadh, Saudi Arabia. *East Mediterr Health J, 25*. https://doi.org/10.26719/emhj.19.062

Almubark, R., Basyouni, M., Alghanem, A., Althumairi, N., Alkhamis, D., Alharbi, L. S., ... & BinDhim, N. (2019). Health literacy in Saudi Arabia: Implications for public health and healthcare access. *Pharmacology Research & Perspectives*, *7*(4), e00514. https://doi.org/10.1002/prp2.514

Alolayyan, M. A. (2016). Prevalence of obesity in elementary school children and its association with dental caries. *Saudi Medical Journal*, 37(12), 1387–1394. doi: 10.15537/smj.2016.12.15904

Alsubaie, A. S. (2017). An assessment of nutrition education in primary schools and its effect on students dietary behaviors and body mass index in Saudi Arabia. *Majmaah Journal of Health Sciences*, *5*(2), 45-56. doi: 10.5455/mjhs.2017.02.006

American Academy of Pediatrics. (2014). Nutrition. Retrieved from http://www.healthychildren.org/English/Pages/default.aspx

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior, 31*(2), 143-164. https://doi.org/10.1177/1090198104263660

Bayer, O., Kries, R., Strauss, A., Mitschek, C., Toschke, A.M., Hose, A., & Koletzko, B.V. (2009). Short- and mid-term effects of a setting based prevention program to obesity risk factors in children: a cluster-randomized trial. *Clinical Nutrition, 28*(2), 122-128. https://doi.org/10.1016/j.clnu.2009.01.001

Belcher, B.R., Berrigan, D., Dodd, K.W., Emken, B.A., Chou, C., & Spuijt-Metz, D. (2010). Physical activity in US youth: impact of race/ethnicity, age, gender, and weight status. *Med Sci Sports Exerc, 42*(12), 2211-2221. doi: 10.1249/MSS.0b013e3181e1fba9

Blom-Hoffman, J., & DuPaul, G. J. (2003). School-based health promotion: The effects of a nutrition education program. *School Psychology Review, 32*(2), 263-271.

Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Krake, A., &... Watzl, B. (2012). Critical review: Vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition, 51*(6), 637-663. doi: l0.1007/s00394-012-0380-y.

Briefel, R. R., Wilson, A., & Gleason, P. M. (2009). Consumption of low-nutrient, energy-dense foods and beverages at school, home, and other locations among school lunch participants and nonparticipants. *Journal of the American Dietetic Association, 109*(2), S79-S90. https://doi.org/10.1016/j.jada.2008.10.064

CDC. (1996). Guidelines for School Health Programs to Promote Lifelong Healthy Eating. *MMWR. 45*(RR-9); 1-33. Retrieved from: http://www.cdc.gov/mmwrpreview/mmwrhtml/00042446. Htm

CDC. (2011). Data and Statistics. *Adolescent and School Health.* Retrieved from http://www.cdc.gov/healthyyouth/data/index.htm

CDC. (2016). Childhood obesity causes & consequences. Retrieved from https://www.cdc.gov/obesity/childhood/causes.htm

CDC. (2018). About child & teen BMI. Retrieved from https://www.cdc.gov/healthyweight/assessing/bmi/childrens_bmi/about_childrens_bmi.html

CDC. (2019). Nutrition education in US schools. Retrieved from https://www.cdc.gov/healthyschools/nutrition/school_nutrition_education.htm

CDC. (2020). How much physical activity do children need? Retrieved from https://www.cdc.gov/physicalactivity/basics/children/index.htm

CDC. (2020). Poor nutrition. Retrieved from https://www.cdc.gov/chronicdisease/resources/publications/factsheets/nutrition.htm

Cha, E. M. (2018). *Factors Affecting Food Intake and BMI in Adolescents Using the Social-Ecological Model* (Doctoral dissertation, The University of Texas School of Public Health). Retrieved from https://search.proquest.com/openview/278755fb228a1e8de00644a88d8a821c/1?pq-origsite=gscholar&cbl=18750&diss=y

Charlton K.E., Brewitt P., & Bourne L.T. (2004). Sources and credibility of nutrition information among black urban South African women, with a focus on messages related to obesity. *Public Health Nutrition, 7*(6), 801-811. https://doi.org/10.1079/PHN2004611

Collison, K. S., Zaidi, M. Z., Subhani, S. N., Al-Rubeaan, K., Shoukri, M., & Al- Mohanna, F. A. (2010). Sugar-sweetened carbonated beverage consumption correlates with BMI, waist circumference, and poor dietary choices in school children. *BMC Public Health*, *10*(1), 234. https://doi.org/10.1186/1471-2458-10-234

Czaja, S. J., Charness, N., Fisk, A. D., Hertzog, C., Nair, S. N., Rogers, W. A., & Sharit, J. (2006). Factors predicting the use of technology: Findings from the center for research and education on aging and technology enhancement (create). *Psychology and Aging, 21*(2), 333–352. https://doi.org/10.1037/0882-7974.21.2.333

Daniels, S. R., Arnett, D. K., Eckel, R. H., Gidding, S. S., Hayman, L. L., Kumanyika, S., ... & Williams, C. L. (2005). Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment. *Circulation, 111*(15), 1999-2012. https://doi.org/10.1161/01.CIR.0000161369.71722.10

Daniels, S. R., Jacobson, M. S., McCrindle, B. W., Eckel, R. H., & Sanner, B. M. (2009). American Heart Association childhood obesity research summit: executive summary. *Circulation, 119*(15), 2114-2123 https://doi.org/10.1161/CIRCULATIONAHA.109.192215

Dietary Guidelines Advisory Committee. (2010). Report of the dietary guidelines advisory committee on the dietary guidelines for Americans, 2010. *US Department of Agriculture and US Department of Health and Human Services. Washington, DC: US Government Printing Office.* Retrieved from https://health.gov/sites/default/files/2020-01/DietaryGuidelines2010.pdf

Donnelly, J.E., Greene, J.L., Gibson, C.A., Smith, B.K., Washburn, R.A., Sullivan, D.K., Dubose, K., Mayo, M.S., Schmelzle, K.H., Ryan, J.J., Jacobsen, D.J., & Williams, S.L. (2009). Physical activity across the curriculum (PAAC): A randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. *Preventive Medicine, 49*(4), 336-341. https://doi.org/10.1016/j.ypmed.2009.07.022

Eid, N. M. (2018). Child Nutrition Programs in Kindergarten Schools Implemented by the Governmental Sector and Global Nutrition Consulting Companies: A Systematic Review. *Current Research in Nutrition and Food Science Journal, 6*(3), 656-663. http://dx.doi.org/10.12944/CRNFSJ.6.3.07

EIU. (n.d.). Qualtrics @ EIU. Retrieved from https://www.eiu.edu/qualtrics/

Farsi, D. J., Elkhodary, H. M., Merdad, L. A., Farsi, N. M., Alaki, S. M., Alamoudi, N. M., ... & Gari, M. A. (2008). Prevalence of iron deficiency anemia among female elementary school children in Northern Jeddah, Saudi Arabia. *Journal of King Abdulaziz University-Medical Sciences*, *15*(1), 63-75. https://doi.org/10.4197/med.15-1.6

General Authority for statistics, Kingdome of Saudi Arabia. (2020). Number of public and private schools by educational stage and years. Retrieved from https://www.stats.gov.sa/en/5800

Frey, B. (2018). The SAGE encyclopedia of educational research, measurement, and evaluation (Vols. 1-4). Thousand Oaks, CA: SAGE Publications, Inc. doi:10.4135/9781506326139

Glanz, K., & Bishop, D.B. (2010) The role of behavioral science theory in development and implementation of public health interventions. *Annual Review of Public Health*, *31*, 399-418. https://doi.org/10.1146/annurev.publhealth.012809.103604

Glanz, K., Rimer, B., & Viswanath, K. (2008). *Health Behavior and Health Education: Theory Research and Practice.* San Francisco, CA: Jossey-Bass.

Golden, S. D., McLeroy, K. R., Green, L. W., Earp, J. A. L., & Lieberman, L. D. (2015). Upending the Social Ecological Model to Guide Health Promotion Efforts Toward Policy and Environmental Change. *Health Education & Behavior*, *42*(1_suppl), 8S-14S. https://doi.org/10.1177/1090198115575098

Green, L. W., Richard, L., & Potvin, L. (1996). Ecological foundations of health promotion. *American Journal of Health Promotion, 10*(4), 270-281. https://doi.org/10.4278/0890-1171-10.4.270

Gregson, J., Foerster, S. B., Orr, R., Jones, L., Benedict, J., Clarke, B., ... & Zotz, K. (2001). System, environmental, and policy changes: using the social-ecological model as a framework for evaluating nutrition education and social marketing programs with low-income audiences. *Journal of Nutrition Education, 33*(Supplement 1), S4-S15. https://doi.org/10.1016/S1499-4046(06)60065-1

Halawani, R., Jaceldo-Siegl, K., Heskey, C., & Bahjri, K. (2019). Saudi Population's Adherence to the Healthy Food Palm: A Cross-sectional Study. *The FASEB Journal, 33*(1_supplement), 755.4.

Hall, E. M. (2015). Evaluation and exploration of nutrition education in elementary schools. *Nutrition & Health Sciences Dissertations & Theses. 59.* http://digitalcommons.unl.edu/nutritiondiss/59

Hess, J., & Slavin, J. (2014). Snacking for a cause: Nutritional insufficiencies and excessive snacking of U.S. children, a critical review of food consumption patterns and macronutrient and micronutrient intake of U.S. children. *Nutrients, 6*(11), 4750-4759. https://doi.org/10.3390/nu6114750

Hess, S. A., & Schultz, J. M. (2008). Bronfenbrenner's ecological model. *Lenses: applying lifespan development theories in counseling, 52.*

IBM. (n.d.). IBM SPSS software. Retrieved from https://www.ibm.com/analytics/spss-statisticssoftware

Keast, D.R., Hill Gallant, K.M., Albertson, A.M., Gugger, C.K., & Holschuh, N.M. (2015). Associations between yogurt, dairy, calcium, and vitamin D intake and obesity among U.S. children aged 8-18 years: NHANES, 2005-2008. *Nutrients, 7*(3), 1577-1593. https://doi.org/10.3390/nu7031577

Knai, C., Pomerleau, J., Lock, K., & McKee, M. (2006). Getting children to eat more fruit and vegetables: A systematic review. *Preventive Medicine, 42*(2), 85-95. https://doi.org/10.1016/j.ypmed.2005.11.012

Krebs-Smith, S.M., Guenther, P.M., Subar, A.F., Kirkpatrick, S.I., & Dodd, K.W. (2010). Americans do not meet federal dietary recommendations. *The Journal of Nutrition, 140*(10), 1832-1838. https://doi.org/10.3945/jn.110.124826

Levi, J., Segal, L.M., Thomas, M.J., Laurent, R., Lang, A., & Rayburn, J. (2013) F as in Fat: How obesity threatens America's future 2013. Retrieved from http://www.ahtd.info/yahoo_site_admin/assets/docs/TFAH2013FasInFatReport29.23782811.pdf

Mansour, M. M., & Alhadidi, K. M. (2012). Vitamin D deficiency in children living in Jeddah, Saudi Arabia. *Indian Journal of Endocrinology and Metabolism, 16*(2), 263. doi:10.4103/2230-8210.93746

Meece, J. L., & Eccles, J. S. (Eds.). (2010). *Handbook of Research on Schools, Schooling and Human Development*. Routledge.

Ministry of Health. (2012). The Healthy Food Palm. Retrieved from https://www.moh.gov.sa/en/Ministry/MediaCenter/Publications/Documents/final%20english%20%20إنجليزي%20العلمي%20الكتاب.pdf

Ministry of Health. (2015). Obesity control program. Retrieved from https://www.moh.gov.sa/en/OCP/Pages/DirectorMessage.aspx

Ministry of health. (2019). School-based obesity control (rashaqa). Retrieved from https://www.moh.gov.sa/en/Ministry/Projects/agility/Pages/default.aspx

Murimi, M., Colvin, J., Liner, K., & Guin, J. (2006). *Methodology to evaluate outcomes of the team nutrition initiative in schools* (No. 2239-2019-2834). https://ageconsearch.umn.edu/record/291995

Nam, B. (2016). *The Social-Ecological Influences on Physical Activity, Dietary Intake, and Obesity Among Adolescents* (Doctoral dissertation, University of California, San Francisco). Retrieved from https://search.proquest.com/openview/2e84ac28f5ceec0fb17ec4783ee30f69/1?pqorigsite=gscholar&cbl=18750&diss=y

National Coalition for Promoting Physical Activity. (n.d.). Physical activity promotion in education. Retrieved from https://www.physicalactivityplan.org/resources/NPAP_Fact_Sheet-Education.pdf

Ng, M., Fleming, T., Robinson, M., Thomson, B., Graetz, N., Margono, C., ... & Abraham, J. P. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet, 384*(9945), 766-781. https://doi.org/10.1016/S0140-6736(14)60460-8

Nixon, C.A., Moore, H.J., Douthwaite, W., Gibson, E.L., Vogele, C., Kreichauf, S., Wildgruber, A., Manios, Y., & Summerbell, C.D. (2012). Identifying effective behavioural models and behavior change strategies underpinning preschool-and school-based obesity prevention interventions aimed at 4-6 year-olds: a systematic review. *Obesity Reviews, 13*(s1), 106-117. https://doi.org/10.1111/j.1467-789X.2011.00962.x

O'Dea, J. A. (2003). Why do kids eat healthful food? Perceived benefits of and barriers to healthful eating and physical activity among children and adolescents. *Journal of the American Dietetic Association, 103*(4), 497-501. https://doi.org/10.1016/S0002-8223(03)00013-0

Patrick H, & Nicklas T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *Journal of the American College of Nutrition, 24*(2), 83-92. https://doi.org/10.1080/07315724.2005.10719448

Perera, T., Frei, S., Frei, B., Wong, S. S., & Bobe, G. (2015). Improving Nutrition Education in US Elementary Schools: Challenges and Opportunities. *Journal of Education and Practice, 6*(30), 41-50.

Perikkou, A., Gavrieli, A., Kougioufa, M. M., Tzirkali, M., & Yannakoulia, M. (2013). A novel approach for increasing fruit consumption in children. *Journal of the Academy of Nutrition and Dietetics, 113*(9), 1188-1193. https://doi.org/10.1016/j.jand.2013.05.024

Peterson, K.E., & Fox, M.K. (2007). Addressing the epidemic of childhood obesity through school-based interventions: what has been done and where do we go from here? *Journal of Law, Medicine & Ethics, 35*(1), 113-130. https://doi.org/10.1111/j.1748-720X.2007.00116.x

Ramsay, S.A., Eskelsen, A.K., Branen, L.J., Armstrong Shultz, J., & Plumb, J. (2014). Nutrient intake and consumption of fruit and vegetables in young children. *Infant, Child, and Adolescent Nutrition, 6*(6), 332-344. https://doi.org/10.1177/1941406414549622

Saudi Food and Drug Authority. (2018). Retrieved from https://www.sfda.gov.sa/ar/food/news/Pages/f8-2-2018a1.aspx?catid=3&news=Main

Saul McLeod. (2019). Likert scale definition, examples and analysis. Retrieved from https://www.simplypsychology.org/likert-scale.html

Statistics Solutions. (2019). Fisher Exact test. Retrieved from https://www.statisticssolutions.com/fisher-exact-test/

Stice, E., Shaw, H., & Marti, C. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin, 132*(5), 667-691. doi: 10.1037/0033-2909.132.5.667

Swearer, S. M., & Doll, B. (2001). Bullying in schools: An ecological framework. *Journal of Emotional Abuse, 2*(2-3), 7-23. https://doi.org/10.1300/J135v02n02_02

Taber, D. R., Chriqui, J. F., Perna, F. M., Powell, L. M., & Chaloupka, F. J. (2012). Weight status among adolescents in states that govern competitive food nutrition content. *Pediatrics, 130*(3), 437-444. https://doi.org/10.1542/peds.2011-3353

UNICEF. (2019). Nutrition infographics. Retrieved from https://www.unicef.org/mena/reports/nutritioninfographics

United States Department of Agriculture. (2013). Healthy, hunger-free kids act of 2010. Retrieved from https://www.fns.usda.gov/school-meals/healthy-hunger-free-kids-act

U.S. Department of Health and Human Services and U.S. Department of Agriculture (2015). 2015–2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at http://health.gov/dietaryguidelines/2015/guidelines/

United States Department of Health and Human Services & United States Department of Agriculture. (2015). Scientific Report of the 2015 Dietary Guidelines Advisory Committee. Retrieved from https://health.gov/sites/default/files/2019-09/Scientific-Report-of-the-2015-Dietary-Guidelines Advisory-Committee.pdf

USDA. (2012). A series of systematic reviews on the effects of nutrition education on children's and adolescents' dietary intake. *Evidence Analysis Library*. Retrieved from https://nesr.usda.gov/nutrition-education-systematic-review-000

USDA-FNS. (2019). Local school wellness policy. Retrieved from https://www.fns.usda.gov/tn/localschool-wellness-policy

USDHHS. (2010). The Surgeon General's vision for a healthy and fit nation. Rockville, MD: U.S. Department of Health and Human Services. Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK44660/pdf/Bookshelf_NBK44660.pdf

WHO. (2006). Food and nutrition policy for schools: A tool for the development of school nutrition programmes in the European Region. Programme for Nutrition and Food Security WHO Regional Office for Europe, Copenhagen.

WHO. (2017). New global estimates of child and adolescent obesity released on World Obesity Day. Retrieved from https://www.who.int/end-childhood-obesity/news/new-estimate-childadolescent obesity/en/

Ying-Ying, G., Bogart, L., Sipple-Asher, B., Uyeda, K., Hawes-Dawson, J., Olarita-Dhungana, J., & Schuster, M. (2009). Using community-based participatory research to identify potential interventions to overcome barriers to adolescents' healthy eating and physical activity. *Journal of Behavioral Medicine, 32*(5), 491-502. https://doi.org/10.1007/s10865-009-9220-9

Appendix

Appendix A: Surveys

The school principals' survey

The school's wellness policy

EASTERN ILLINOIS UNIVERSITY™

Eastern Illinois University
Informed Consent to Participate in Research

Study title: Nutrition Education in Elementary Schools in Jeddah, Saudi Arabia

Researcher[s]: My name is Asma Yahya. I'm a graduate student at Eastern Illinois University, Charleston, IL. I'm pursuing a Master of Science in Nutrition and Dietetics, with a concentration in Nutrition Education. I'm inviting you to take a survey for research. This survey is completely voluntary. There are no negative consequences if you don't want to take it. If you start the survey, you can always change your mind and stop at any time.

What is the purpose of this study?
The purpose of this study is to understand how school environments in Jeddah, Saudi Arabia promote student's access to physical activity and nutrition education.

What will I do?
This study includes one questionnaire that asks about personal characteristics (such as age (years), education level, the subject that you are teaching, and years of experience), their perspectives on teaching nutrition and the school health environment. The response to the questionnaire is expected to take approximately 10 minutes.

Risks
There are very few risks with being in this study. Some questions may be personal. You can skip them or quit the survey at any time.

· Online data being hacked or intercepted: Anytime you share information online there are risks. I'm using a secure system to collect this data, but I can't completely eliminate this risk.

· Breach of confidentiality: There is a chance your data could be seen by someone who shouldn't have access to it. I'm minimizing this risk in the following ways:
  - Data is anonymous (Names or identities will not be required).
  - No one will see your survey
  - I'll store all electronic data on a password-protected, encrypted computer.
  - I'll keep your study consent information separate from your research data.
  - I also pledge to use the answers for this research only, and not for another purpose.

Possible benefits
The findings of this study may be beneficial to the Ministry of Health and Ministry of Education in Saudi Arabia regarding the importance of nutrition education in schools. Moreover, the results of this study contribute to establishing nutritional education programs to raise nutrition awareness among the people in Saudi Arabia, and thus raise the level of health and overcome many diseases. Additionally, the results of this study become a reference for future research in the field of nutrition in Saudi Arabia. Therefore, your answers are very important to me.

How long will it take?
It should take about 10 minutes to complete the survey.

Costs
There are no costs to you to participate.

Compensation
There is no compensation for completing this survey.

Where will data be stored?
The data will be stored on the researcher's computer, which is password-protected, and on the servers for the online survey software (Qualtrics).

How long will it be kept?
Any study consent information will be maintained for 3 years, then the file will be deleted. The de-identified data file will be maintained for up to 10 years.

Who can see my data?
- I (the researcher) will have access to the data of the questionnaire's responses without knowing the identity of the owner of the responses. This is so I can analyze the data and conduct the study.
- Agencies that enforce legal and ethical guidelines, such as
  - The Institutional Review Board (IRB) at EIU
  - The Office for Human Research Protections (OHRP)
- We may share our findings in publications or presentations. If we do, the results will be aggregated (grouped) data, with no individual results – or – de-identified (no names, etc.).

Questions about the research, complaints, or problems
Contact Dr. Krystal Lynch, the faculty sponsor for this project, at kllynch@eiu.edu or 1-217- 581-7843.

Questions about your rights as a research participant, complaints, or problems
Contact the Eastern Illinois Institutional Review Board at:
Institutional Review Board
Eastern Illinois University
600 Lincoln Ave
Charleston, IL 61920
Telephone: 1-217-581-8576
Email: irb@eiu.edu.

Please print or save this screen if you want to be able to access the information later.
IRB #: 20-058
IRB Approval Date: April 27, 2020

Agreement to Participate
Your participation is completely voluntary, and you can withdraw at any time.
To take this survey, you must be:
- At least 18 years old
- Work at a government all-girls primary school in Jeddah city, Saudi Arabia.

If you meet these criteria and would like to take the survey, click the button below to start.

Next

Survey Powered By Qualtrics

EASTERN ILLINOIS UNIVERSITY

What is your position at the school?

How many students attend school?

How many teachers work at the school?

Does your school have a formal school wellness policy?

- Yes
- No

If Yes, would you be willing to share the policy with me?

Is there a wellness coordinator in the school, who is responsible for discovering and following up on the students' health?

- Yes
- No

If Yes, what are her tasks in the school?

I have participated in preventive and awareness training (or qualifying workshops) related to healthy nutrition at the school.

- ○ Yes
- ○ No

I have participated in preventive and awareness training (or qualifying workshops) related to physical activity at the school.

- ○ Yes
- ○ No

Staff is provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about nutrition, including how to integrate it into the core instruction.

- ☐ Yes
- ☐ No

Staff is provided with educational opportunities (distribution of educational materials, presentations, workshops, etc.) to learn about physical activity, including how to integrate it into the core instruction.

- ○ Yes
- ○ No

Teachers have adequate materials and resources to provide current nutrition education in the classroom.

- ○ Yes
- ○ No

The teachers' survey

Questionnaire to assess the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia

EASTERN ILLINOIS UNIVERSITY

Eastern Illinois University
Informed Consent to Participate in Research

Study title: Nutrition Education in Elementary Schools in Jeddah, Saudi Arabia

Researcher[s]: My name is Asma Yahya. I'm a graduate student at Eastern Illinois University, Charleston, IL. I'm pursuing a Master of Science in Nutrition and Dietetics, with a concentration in Nutrition Education.
I'm inviting you to take a survey for research. This survey is completely voluntary. There are no negative consequences if you don't want to take it. If you start the survey, you can always change your mind and stop at any time.

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What will I do?
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· Breach of confidentiality: There is a chance your data could be seen by someone who shouldn't have access to it. I'm minimizing this risk in the following ways:
  - Data is anonymous (Names or identities will not be required).
  - No one will see your survey
  - I'll store all electronic data on a password-protected, encrypted computer.
  - I'll keep your study consent information separate from your research data.
  - I also pledge to use the answers for this research only, and not for another purpose.

Possible benefits
The findings of this study may be beneficial to the Ministry of Health and Ministry of Education in Saudi Arabia regarding the importance of nutrition education in schools. Moreover, the results of this study contribute to establishing nutritional education programs to raise nutrition awareness among the people in Saudi Arabia, and thus raise the level of health and overcome many diseases. Additionally, the results of this study become a reference for future research in the field of nutrition in Saudi Arabia. Therefore, your answers are very important to me.

How long will it take?
It should take about 10 minutes to complete the survey.

Costs
There are no costs to you to participate.

Compensation
There is no compensation for completing this survey.

Where will data be stored?
The data will be stored on the researcher's computer, which is password-protected, and on the servers for the online survey software (Qualtrics).

How long will it be kept?
Any study consent information will be maintained for 3 years, then the file will be deleted. The de-identified data file will be maintained for up to 10 years.

Who can see my data?

- I (the researcher) will have access to the data of the questionnaire's responses without knowing the identity of the owner of the responses. This is so I can analyze the data and conduct the study.
- Agencies that enforce legal and ethical guidelines, such as
  - The Institutional Review Board (IRB) at EIU
  - The Office for Human Research Protections (OHRP)
- We may share our findings in publications or presentations. If we do, the results will be aggregated (grouped) data, with no individual results – or – de-identified (no names, etc.).

Questions about the research, complaints, or problems
Contact Dr. Krystal Lynch, the faculty sponsor for this project, at kllynch@eiu.edu or 1-217- 581-7843.

Questions about your rights as a research participant, complaints, or problems
Contact the Eastern Illinois Institutional Review Board at:
Institutional Review Board
Eastern Illinois University
600 Lincoln Ave
Charleston, IL 61920
Telephone: 1-217-581-8576
Email: irb@eiu.edu.

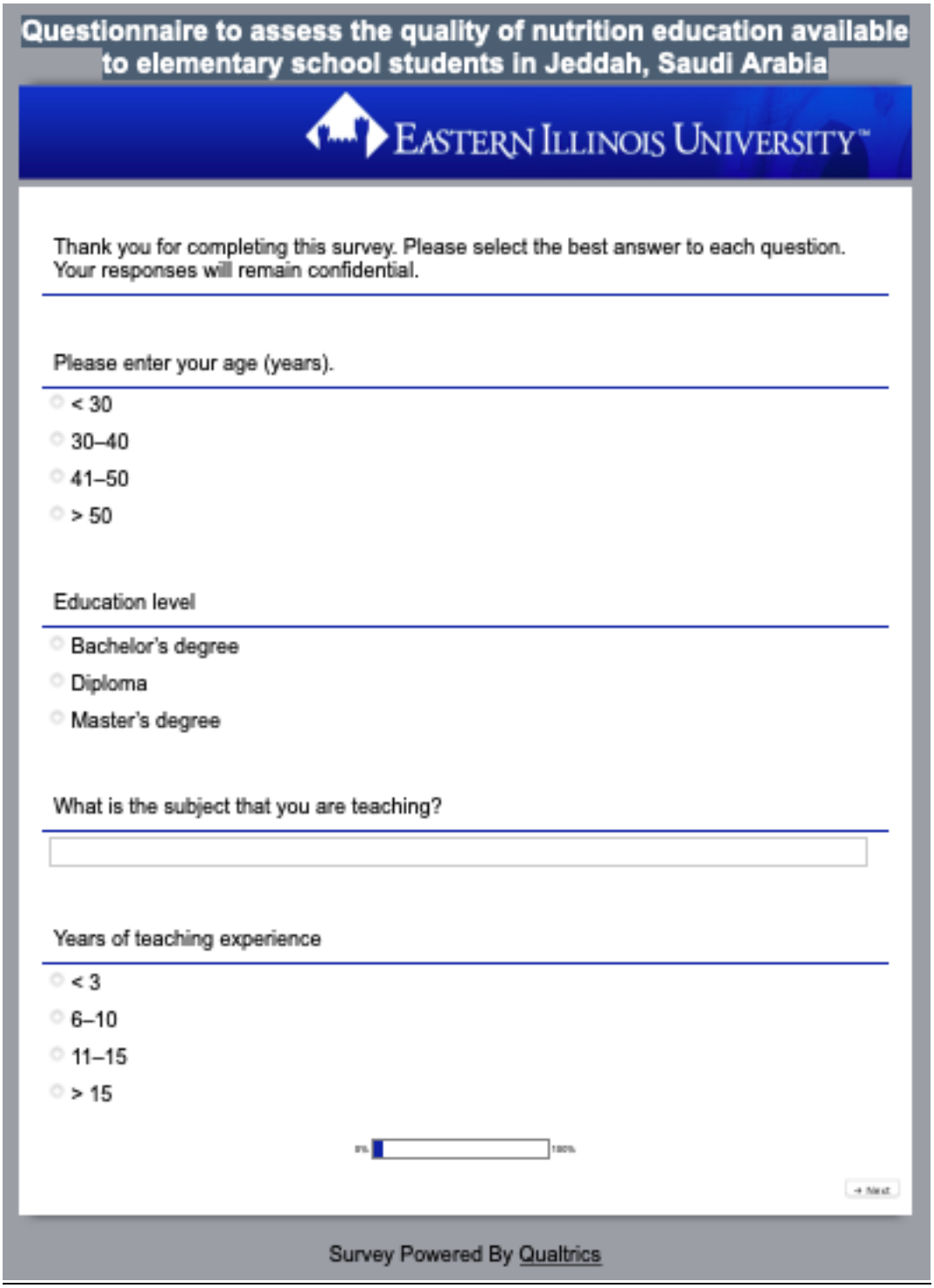
Please print or save this screen if you want to be able to access the information later.
IRB #: 20-058
IRB Approval Date: April 27, 2020

Agreement to Participate
Your participation is completely voluntary, and you can withdraw at any time.
To take this survey, you must be:

- At least 18 years old
- Work at a government all-girls primary school in Jeddah city, Saudi Arabia.

If you meet these criteria and would like to take the survey, click the button below to start.

Survey Powered By Qualtrics



Questionnaire to assess the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia

EASTERN ILLINOIS UNIVERSITY

Thank you for completing this survey. Please select the best answer to each question. Your responses will remain confidential.

Please enter your age (years).

- < 30
- 30–40
- 41–50
- > 50

Education level

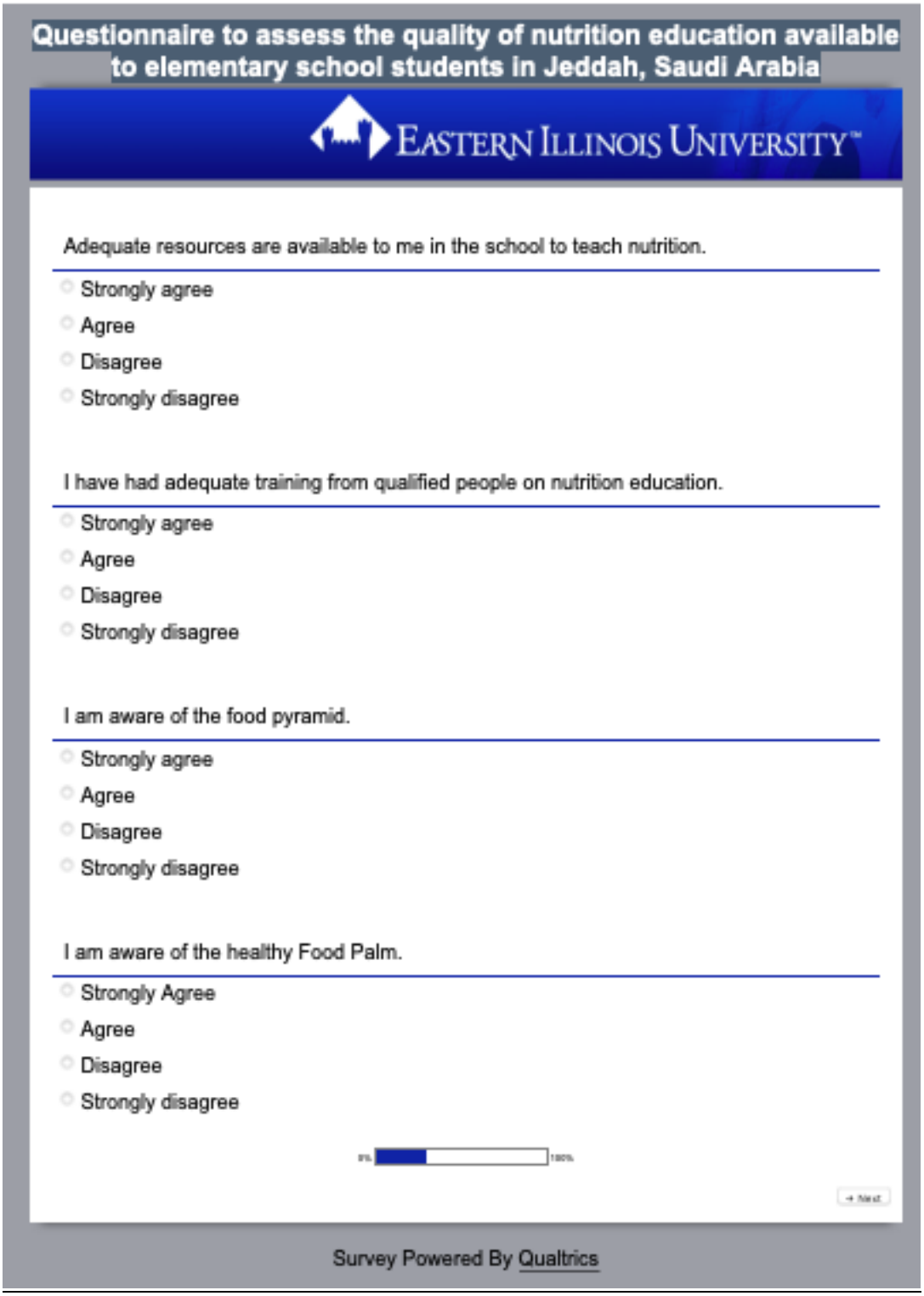
- Bachelor's degree
- Diploma
- Master's degree

What is the subject that you are teaching?

Years of teaching experience

- < 3
- 6–10
- 11–15
- > 15

Survey Powered By Qualtrics



Questionnaire to assess the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia

EASTERN ILLINOIS UNIVERSITY

Adequate resources are available to me in the school to teach nutrition.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

I have had adequate training from qualified people on nutrition education.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

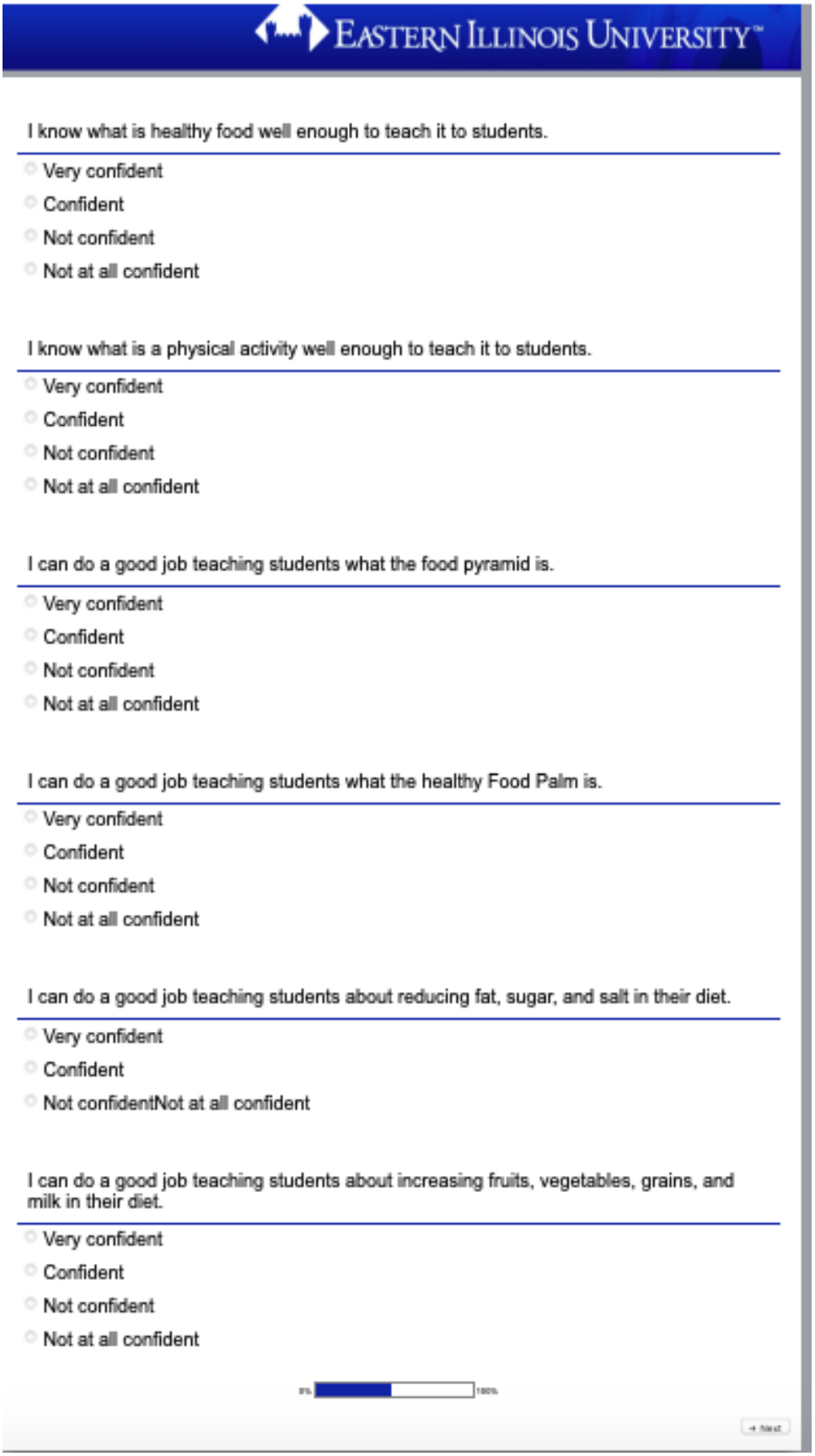
I am aware of the food pyramid.

- Strongly agree
- Agree
- Disagree
- Strongly disagree

I am aware of the healthy Food Palm.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree

Survey Powered By Qualtrics



EASTERN ILLINOIS UNIVERSITY

I know what is healthy food well enough to teach it to students.

- Very confident
- Confident
- Not confident
- Not at all confident

I know what is a physical activity well enough to teach it to students.

- Very confident
- Confident
- Not confident
- Not at all confident

I can do a good job teaching students what the food pyramid is.

- Very confident
- Confident
- Not confident
- Not at all confident

I can do a good job teaching students what the healthy Food Palm is.

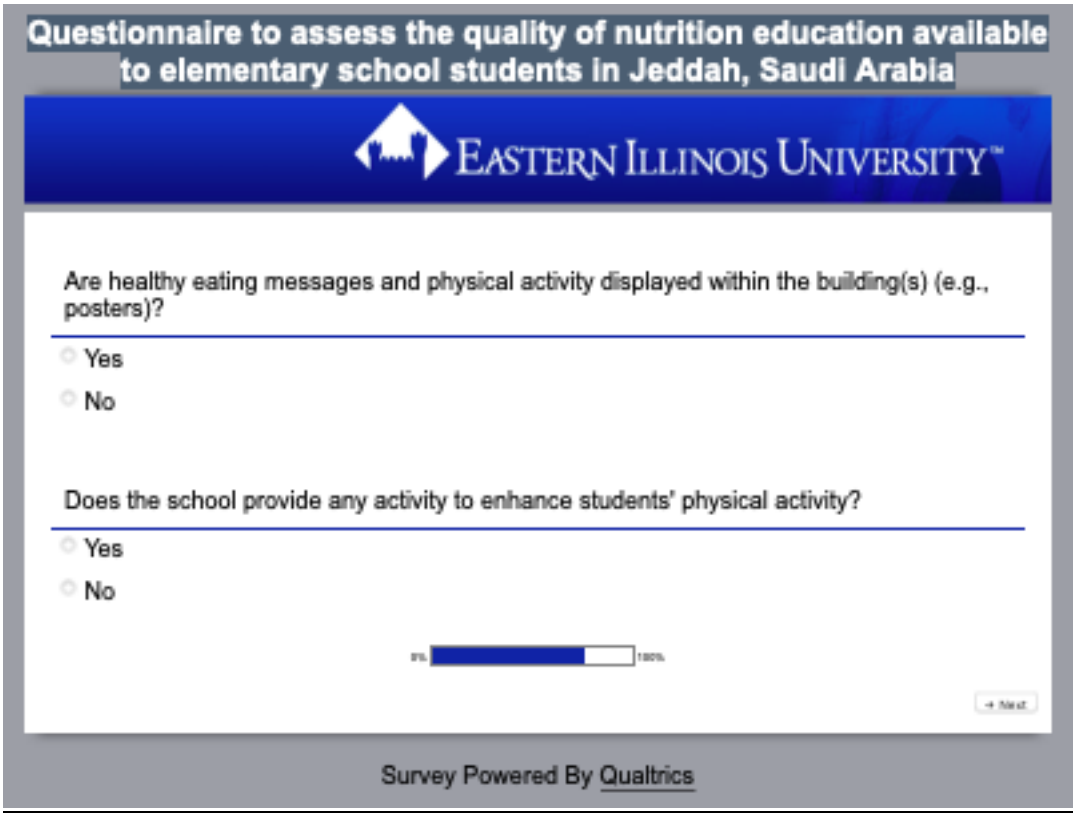
- Very confident
- Confident
- Not confident
- Not at all confident

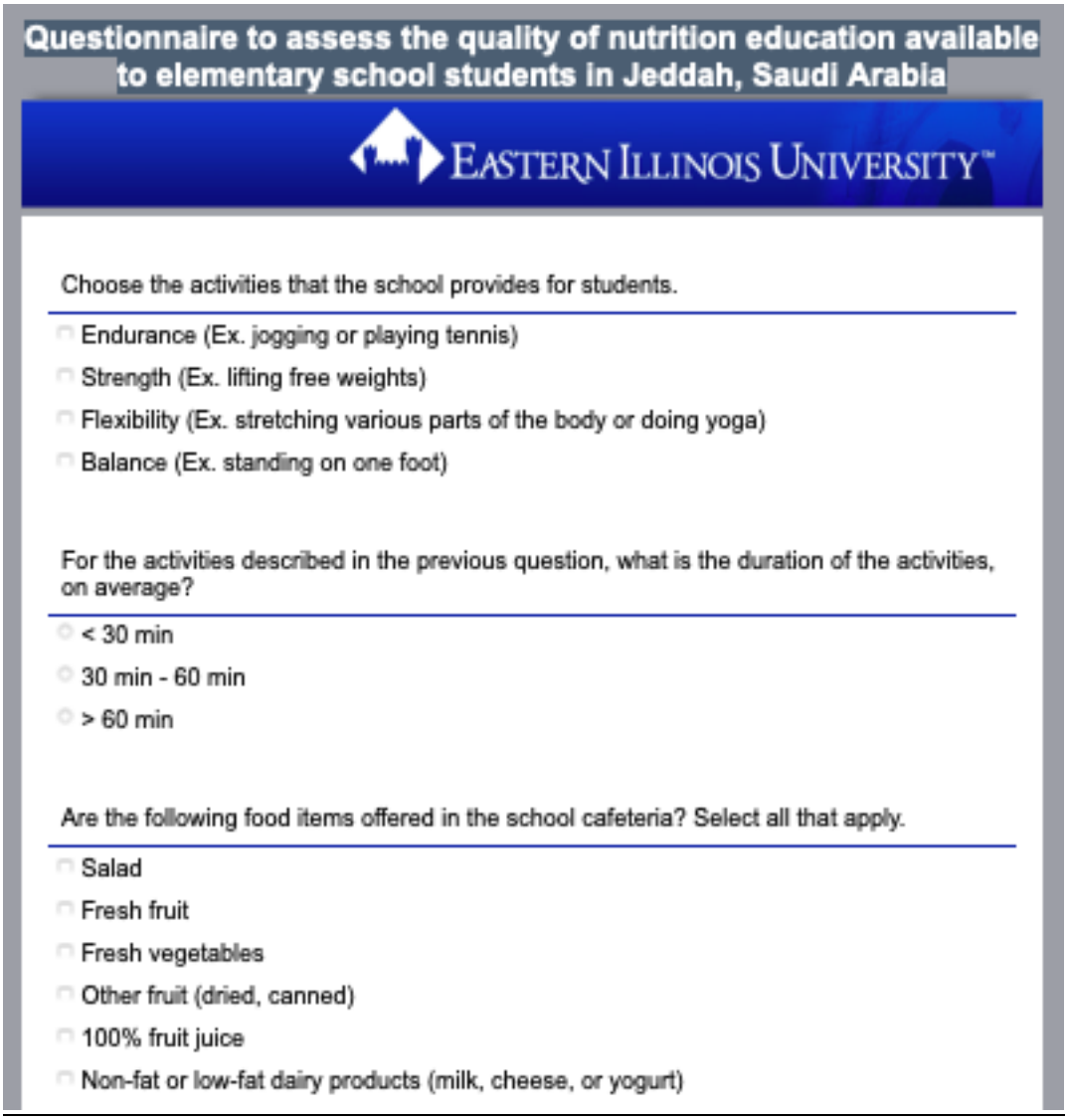
I can do a good job teaching students about reducing fat, sugar, and salt in their diet.

- Very confident
- Confident
- Not confidentNot at all confident

I can do a good job teaching students about increasing fruits, vegetables, grains, and milk in their diet.

- Very confident
- Confident
- Not confident
- Not at all confident


Questionnaire to assess the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia
EASTERN ILLINOIS UNIVERSITY
Are healthy eating messages and physical activity displayed within the building(s) (e.g., posters)?
Yes
No
Does the school provide any activity to enhance students' physical activity?
Yes
No
Survey Powered By Qualtrics



Questionnaire to assess the quality of nutrition education available to elementary school students in Jeddah, Saudi Arabia

EASTERN ILLINOIS UNIVERSITY

Choose the activities that the school provides for students.

- Endurance (Ex. jogging or playing tennis)
- Strength (Ex. lifting free weights)
- Flexibility (Ex. stretching various parts of the body or doing yoga)
- Balance (Ex. standing on one foot)

For the activities described in the previous question, what is the duration of the activities, on average?

- < 30 min
- 30 min - 60 min
- > 60 min

Are the following food items offered in the school cafeteria? Select all that apply.

- Salad
- Fresh fruit
- Fresh vegetables
- Other fruit (dried, canned)
- 100% fruit juice
- Non-fat or low-fat dairy products (milk, cheese, or yogurt)

Appendix B: The Social-Ecological Model

Source: Adapted from the Centers for Disease Control and Prevention (CDC), The Social-Ecological Model: A Framework for Prevention, https://www.cdc.gov/ViolencePrevention/pdf/SEM_Framewrk-a.pdf (Retrieved August 31, 2020).

Appendix C: Summary of the relationships test results between teachers' characteristics (age, education level, the subject that teachers are teaching, and the years of teaching experience) and their perspective and confidence level in teaching nutrition

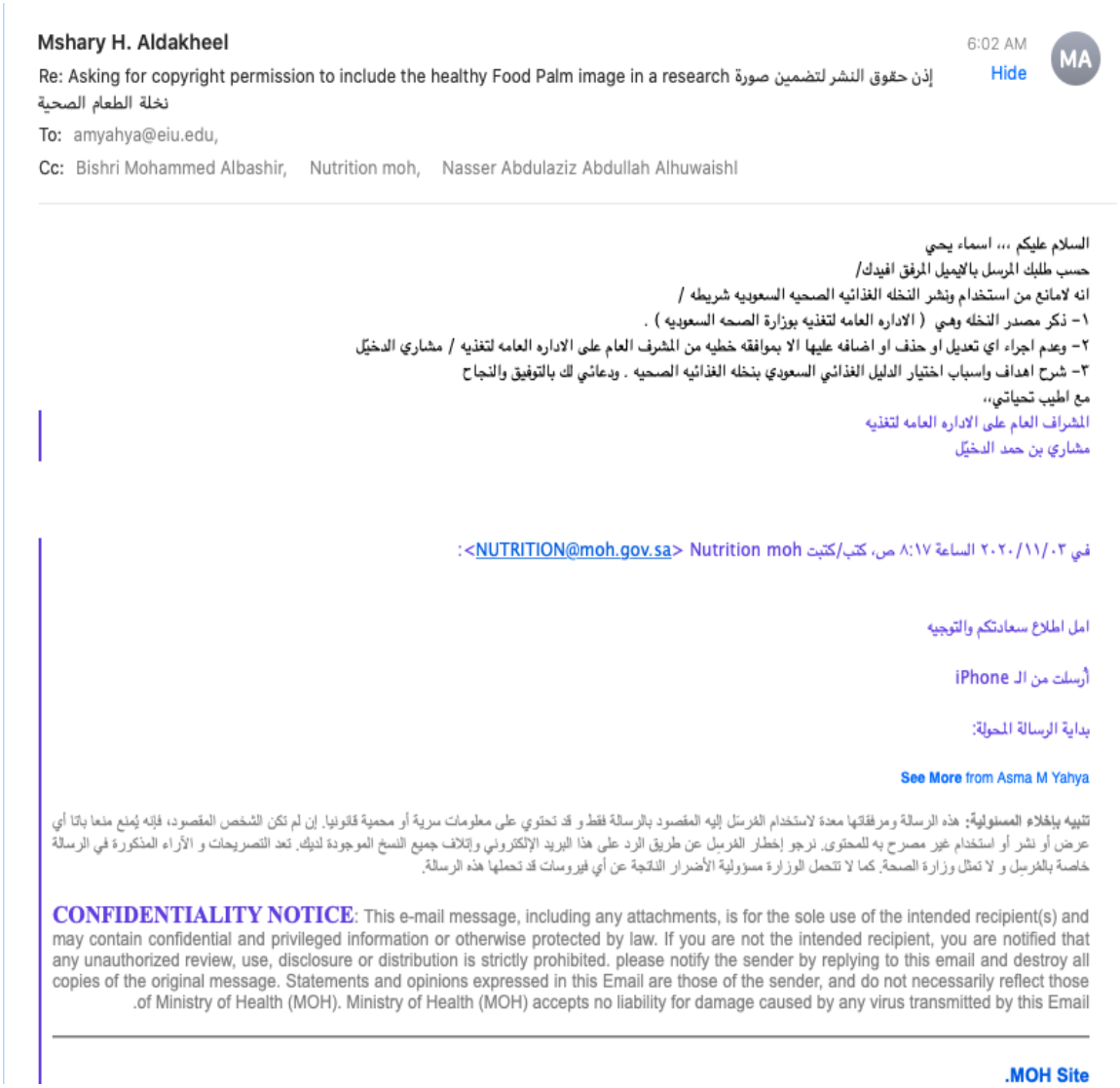
Relationship between characteristics and statements	*P* value
Age * Adequate resources are available to me in the school to teach nutrition	0.016
Age * I have had adequate training from qualified people on nutrition education	0.064
Age * I am aware of the food pyramid	0.944
Age * I am aware of the healthy Food Palm	0.961
Age * I know what healthy food is well enough to teach it to students	0.875
Age * I know what physical activity is well enough to teach it to students	0.118
Age * I can do a good job teaching student what the food pyramid	0.868
Age * I can do a good job teaching student what the healthy Food Palm	0.868
Age * I can do a good job teaching student about reducing fat, sugar, and salt in their diet	0.071
Education level * Adequate resources are available to me in the school to teach nutrition	0.515
Education level * I have had adequate training from qualified people on nutrition education	0.385
Education level * I am aware of the food pyramid	0.905
Education level * I am aware of the healthy Food Palm	0.216
Education level * I know what healthy food is well enough to teach it to students	0.679
Education level * I know what physical activity is well enough to teach it to students	0.320
Education level * I can do a good job teaching student what the food pyramid	0.389
Education level * I can do a good job teaching student what the healthy Food Palm	0.384
Education level * I can do a good job teaching student about reducing fat, sugar, and salt in their diet	0.216
The subjects taught by teachers * Adequate resources are available to me in the school to teach nutrition	0.877
The subjects taught by teachers * I have had adequate training from qualified people on nutrition education	0.382

The subjects taught by teachers * I am aware of the food pyramid	0.782
The subjects taught by teachers * I am aware of the healthy Food Palm	0.777
The subjects taught by teachers* I know what healthy food is well enough to teach it to students	0.753
The subjects taught by teachers * I know what physical activity is well enough to teach it to students	0.410
The subjects taught by teachers * I can do a good job teaching student what the food pyramid	0.731
The subjects taught by teachers * I can do a good job teaching student what the healthy Food Palm	0.620
The subjects taught by teachers * I can do a good job teaching student about reducing fat, sugar, and salt in their diet	0.918
Years of teaching experience * Adequate resources are available to me in the school to teach nutrition	0.786
Years of teaching experience * I have had adequate training from qualified people on nutrition education	0.980
Years of teaching experience * I am aware of the food pyramid	0.517
Years of teaching experience * I am aware of the healthy Food Palm	0.145
Years of teaching experience* I know what healthy food is well enough to teach it to students	0.716
Years of teaching experience * I know what physical activity is well enough to teach it to students	0.185
Years of teaching experience * I can do a good job teaching student what the food pyramid	0.099
Years of teaching experience * I can do a good job teaching student what the healthy Food Palm	0.305
Years of teaching experience * I can do a good job teaching student about reducing fat, sugar, and salt in their diet	0.504

Note. A P-value < 0.05 considered statistically significant

Appendix D: Copyright permission from the General Administration of Nutrition in the Saudi Ministry of Health, to include the Healthy Food Palm's figure

The original email



Mshary H. Aldakheel 6:02 AM Hide MA

Re: Asking for copyright permission to include the healthy Food Palm image in a research إذن حقوق النشر لتضمين صورة نخلة الطعام الصحية

To: amyahya@eiu.edu,

Cc: Bishri Mohammed Albashir, Nutrition moh, Nasser Abdulaziz Abdullah Alhuwaishl

السلام عليكم ،،، اسماء يحي
حسب طلبك المرسل بالايميل المرفق افيدك/
انه لامانع من استخدام ونشر النخله الغذائيه الصحيه السعوديه شريطه /
١- ذكر مصدر النخله وهي (الاداره العامه لتغذيه بوزارة الصحه السعوديه) .
٢- وعدم اجراء اي تعديل او حذف او اضافه عليها الا بموافقه خطيه من المشرف العام على الاداره العامه لتغذيه / مشاري الدخيّل
٣- شرح اهداف واسباب اختيار الدليل الغذائي السعودي بنخله الغذائيه الصحيه . ودعائي لك بالتوفيق والنجاح
مع اطيب تحياتي،،
المشراف العام على الاداره العامه لتغذيه
مشاري بن حمد الدخيّل

في ٢٠٢٠/١١/٠٣ الساعة ٨:١٧ ص، كتب/كتبت Nutrition moh <NUTRITION@moh.gov.sa>:

امل اطلاع سعادتكم والتوجيه

أرسلت من الـ iPhone

بداية الرسالة المحولة:

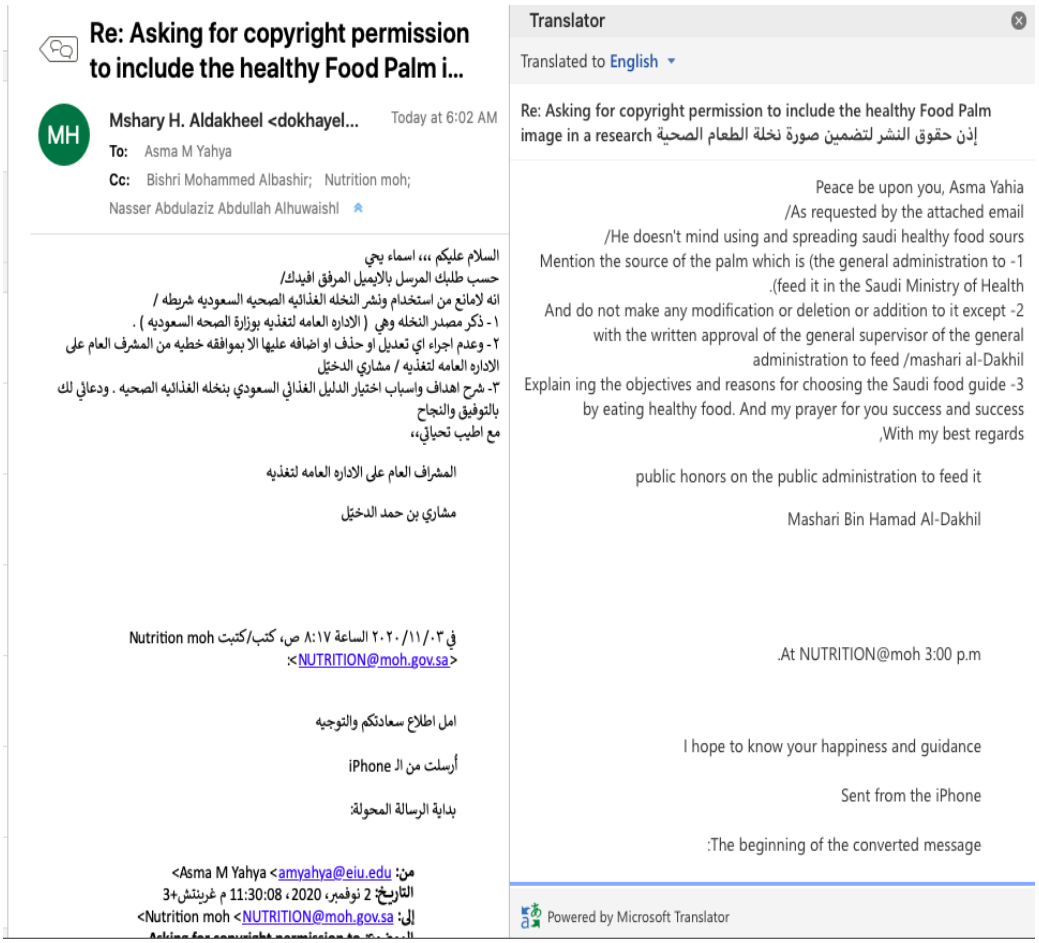
See More from Asma M Yahya

تنبيه بإخلاء المسئولية: هذه الرسالة ومرفقاتها معدة لاستخدام المرسل إليه المقصود بالرسالة فقط و قد تحتوي على معلومات سرية أو محمية قانونيا. إن لم تكن الشخص المقصود، فإنه يُمنع منعا باتا أي عرض أو نشر أو استخدام غير مصرح به للمحتوى. نرجو إخطار المرسل عن طريق الرد على هذا البريد الإلكتروني وإتلاف جميع النسخ الموجودة لديك. تعد التصريحات و الآراء المذكورة في الرسالة خاصة بالمرسل و لا تمثل وزارة الصحة. كما لا تتحمل الوزارة مسؤولية الأضرار الناتجة عن أي فيروسات قد تحملها هذه الرسالة.

CONFIDENTIALITY NOTICE: This e-mail message, including any attachments, is for the sole use of the intended recipient(s) and may contain confidential and privileged information or otherwise protected by law. If you are not the intended recipient, you are notified that any unauthorized review, use, disclosure or distribution is strictly prohibited. please notify the sender by replying to this email and destroy all copies of the original message. Statements and opinions expressed in this Email are those of the sender, and do not necessarily reflect those .of Ministry of Health (MOH). Ministry of Health (MOH) accepts no liability for damage caused by any virus transmitted by this Email

.MOH Site

The original email with the translation



Re: Asking for copyright permission to include the healthy Food Palm i...

MH

Mshary H. Aldakheel <dokhayel... Today at 6:02 AM

To: Asma M Yahya

Cc: Bishri Mohammed Albashir; Nutrition moh; Nasser Abdulaziz Abdullah Alhuwaishl

السلام عليكم ،،، اسماء يحي
حسب طلبك المرسل بالايميل المرفق افيدك/
انه لامانع من استخدام ونشر النخله الغذائيه الصحيه السعوديه شريطه /
١- ذكر مصدر النخله وهي (الاداره العامه لتغذيه بوزارة الصحه السعوديه) .
٢- وعدم اجراء اي تعديل او حذف او اضافه عليها الا بموافقه خطيه من المشرف العام على الاداره العامه لتغذيه / مشاري الدخيّل
٣- شرح اهداف واسباب اختيار الدليل الغذائي السعودي بنخله الغذائيه الصحيه . ودعائي لك بالتوفيق والنجاح
مع اطيب تحياتي،،

المشرف العام على الاداره العامه لتغذيه

مشاري بن حمد الدخيّل

في ٠٣/١١/٢٠٢٠ الساعة ٨:١٧ ص، كتب/كتبت Nutrition moh <NUTRITION@moh.gov.sa>:

امل اطلاع سعادتكم والتوجيه

أرسلت من الـ iPhone

بداية الرسالة المحولة:

من: Asma M Yahya <amyahya@eiu.edu>
التاريخ: 2 نوفمبر، 2020، 11:30:08 م غرينتش+3
إلى: Nutrition moh <NUTRITION@moh.gov.sa>

Translator

Translated to English

Re: Asking for copyright permission to include the healthy Food Palm image in a research إذن حقوق النشر لتضمين صورة نخلة الطعام الصحية

Peace be upon you, Asma Yahia
/As requested by the attached email
/He doesn't mind using and spreading saudi healthy food sours
1- Mention the source of the palm which is (the general administration to feed it in the Saudi Ministry of Health).
2- And do not make any modification or deletion or addition to it except with the written approval of the general supervisor of the general administration to feed /mashari al-Dakhil
3- Explain ing the objectives and reasons for choosing the Saudi food guide by eating healthy food. And my prayer for you success and success
,With my best regards

public honors on the public administration to feed it

Mashari Bin Hamad Al-Dakhil

.At NUTRITION@moh 3:00 p.m

I hope to know your happiness and guidance

Sent from the iPhone

:The beginning of the converted message

Powered by Microsoft Translator